OCTOBER 22, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

GROWING PROBLEM IN LABOR:

Differentials In Wages

For five routes industry can take to find its way out of the dilemma, see page 45

✔ Molybdenum: Open for Business . . . page 80

✔ Why Some Bars Are Hard To Get . . . page 119

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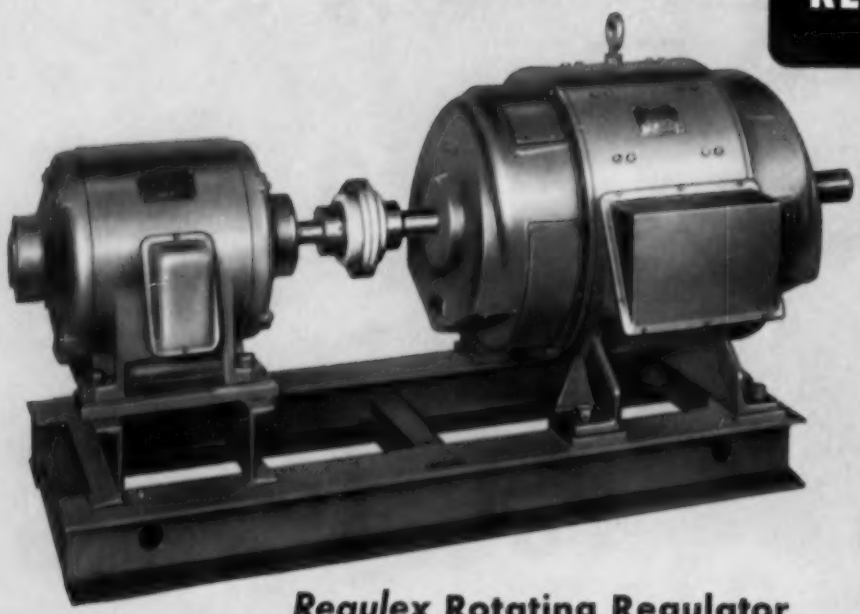
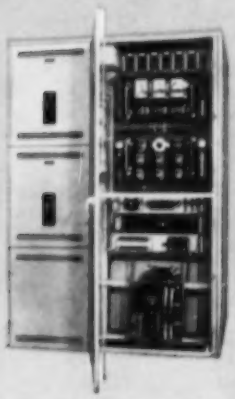
A Type and Size for Your Specific Needs

ALLIS-CHALMERS REGULATORS



***Regulex* Rotating Regulator**



Regulex regulator consists of m-g set and cubicle containing static elements. Cubicle may be combined with switchgear.

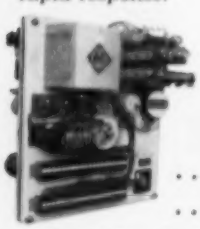
- Stability during high power-factor operations.
- Increased operating limits through automatic minimum excitation.
- High sensitivity and rapid response.

How It Works . . .

Automatic minimum excitation permits generator operation close to stability limit — much closer than manual operation. Sensitivity and quick response of *Regulex* regulator establish and maintain safe ratio between generator load and field current.

Where It Is Used . . .

In power plant application for voltage regulation of large generators or synchronous condensers. In industrial applications for regulating current, voltage, speed, tension, and reversing of processing mill equipment, and for arc-furnace control.



Magnetic AMPLIFIERS

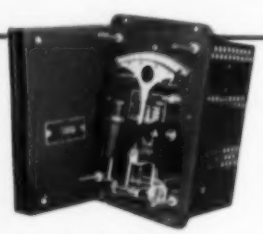
. . . Low maintenance

. . . High sensitivity

Designed for applications requiring high sensitivity and response, where regulator is subjected to shock, or where continuous performance is a prime factor. Used in conjunction with *Regulex* unit when reversed polarity output is required. Since the magnetic amplifier has no moving parts it requires little maintenance.

For complete information call your Allis-Chalmers representative, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

Electromechanical *Rocking Contact* Type Regulators



For voltage regulation of smaller ac and dc generators.

- Varies resistance in exciter shunt field by rocking action.
- Quick regulation over entire range with short movement.
- No sluggish relays.
- No vibrating or sliding contacts to wear.

Regulex and *Rocking Contact* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

A-5073

He's Paving the Way for a Good Drop Forging

Not all craftsmen paint pictures or make watches. Here's one whose artistry helps shape intricate dies for Bethlehem drop forgings.

That's a job requiring infinite patience, a skilled touch, and a world of experience. Bethlehem die-sinkers qualify on all counts, and the results of their craftsmanship are clearly evident in the finished forgings.

They're a capable group, these die men. But you could say the same thing for everyone concerned with Bethlehem drop forgings. In our fully integrated operation, which starts with the making of the steel, each step is handled by experts. Men whose standards are high.

Yet Bethlehem prices and deliveries are fully competitive. It will be worth your while to investigate our services. May we have the opportunity to quote on your requirements?

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

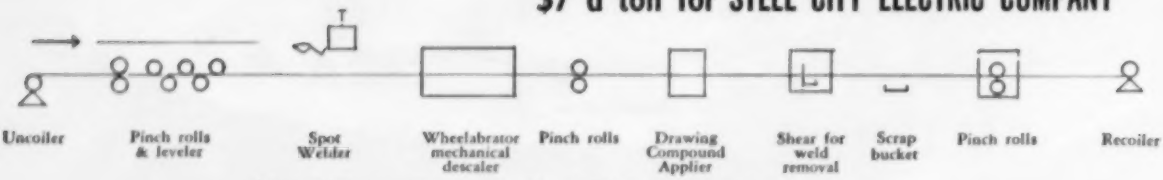
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

How much would you SAVE in one year by *cutting steel costs* $7 a ton?

Wheelabrator® Mechanical Descaling saves $7 a ton for STEEL CITY ELECTRIC COMPANY



Schematic Diagram: Strip Cleaning Line, Steel City Electric Company

Only one man is required to operate the mechanical descaling line at Steel City Electric Co.

Strip is Wheelabrated prior to stamping and electrogalvanizing of electrical products.

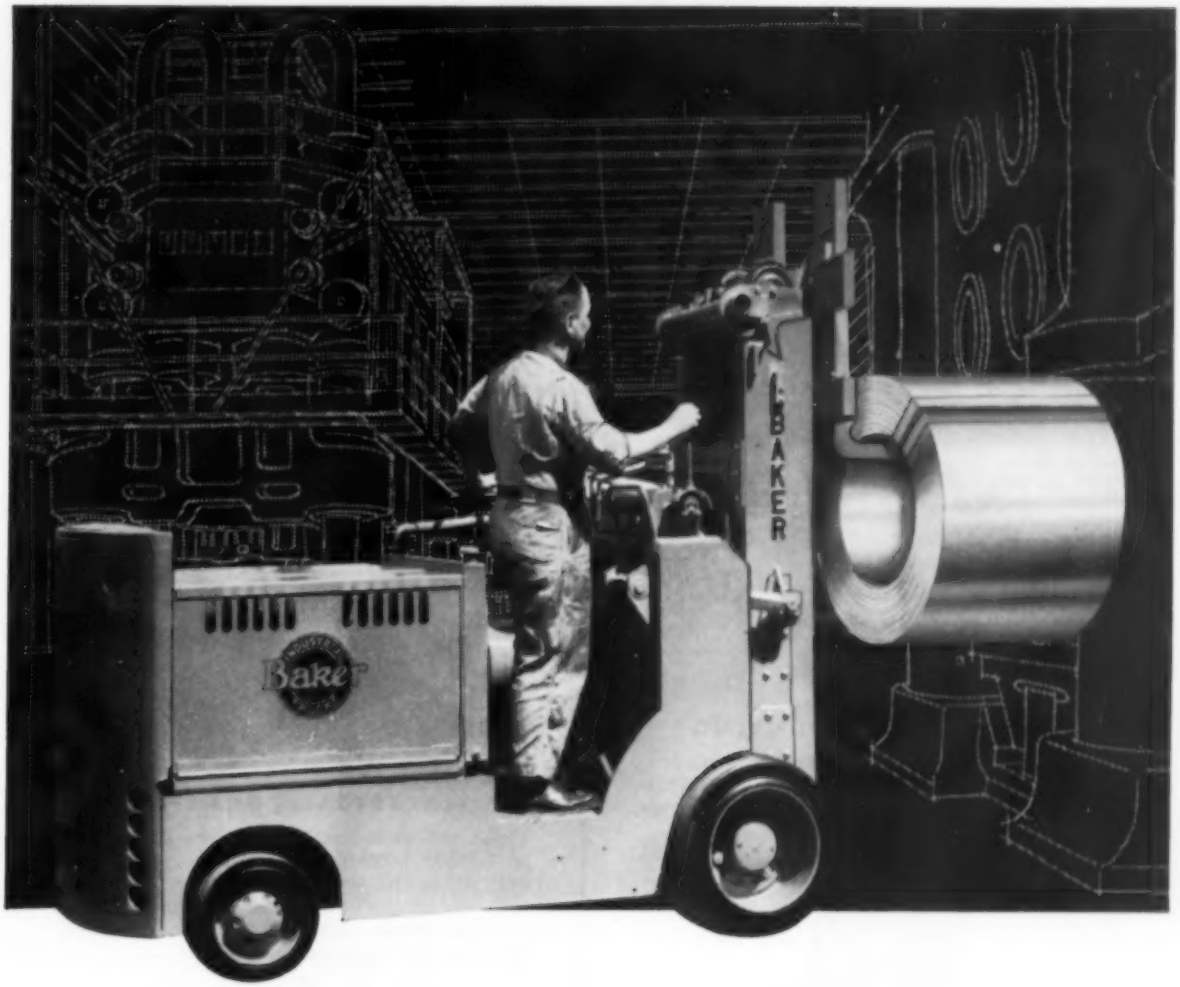
Cleaning hot rolled 1010 steel strip in a Wheelabrator mechanical descaler for $3 a ton has brought big savings for Steel City Electric Company of Pittsburgh, which was paying a premium of $10 a ton for pickled steel from the mill. The $3 figure includes the operating cost for all equipment in the cleaning line. Cleaning strip up to 48" wide and from .060" to .1875" thick, the Wheelabrator descaler cleans an average of 50 tons of steel in an 8-hour day — a potential saving of $350 in steel costs every 8 hours. Don't let saving like this pass you by — investigate Wheelabrator mechanical descaling today. Find out how it can be tailored to your specific needs.

For more information on Wheelabrator savings for steel processors, write today for Bulletin 128D.

WHEELABRATOR

CORPORATION

509 S. Byrkit Street, Mishawaka, Indiana



BAKER "JOM"—a BIG truck for efficient handling of BIG loads up to 10,000 pounds

Here is a rugged, heavy-duty fork or ram truck designed specifically for dependable handling of big, heavy loads. Capacities 7000, 8000 and 10,000 pounds.

Travel motor designed and built by Baker for grueling heavy service has high overload capacity. Five forward and reverse speeds. Foolproof electric interlock makes it impossible to start in high . . . assures smooth starts, protects motor, truck, and load. Automatic power shut-off and braking provides added safety when operator leaves his position.

Power steering makes the JOM easy to operate, reduces operator fatigue, means more work. Easily manipulated levers are conveniently located for greatest safety and most efficient operation. Low-cut design of the JOM gives the operator complete all-around vision of the load and road at all times.

Frame is of heavy gauge steel welded into a rigid one-piece assembly. Bumper counterweight is integral part of the frame for extra strength and stability.

Service time and costs are further reduced because all components are easily accessible . . . not hidden or covered by the frame. Write for Bulletin 1328.

Baker handling equipment

THE BAKER-RAULANG COMPANY

1259 WEST 80th STREET • CLEVELAND 2, OHIO

A subsidiary of Otis Elevator Company

46-5

THE

A B C

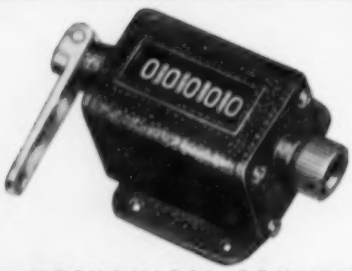
OF

1 2 3

Why is COUNTROL

important in every business today?

Countless times a day, every business needs to know "how many? . . . how much? . . . how far? . . ." and many other questions that can be answered only by facts-in-figures. But how to get these figures . . . from so many different machines, processes, operations and systems? Veeder-Root Counters are doing it every day, by means of:



MECHANICAL COUNTING

Small Resets count strokes, turns, or pieces . . . are used by thousands for moderate duty in parts inspection, quality control, conveyors, machine tools, light presses, etc.

HAND COUNTING

Where objects or units cannot be counted electrically or mechanically, hand-operated counters like this Hand Tally do the job. For instance, quick spot checks of production or performance, traffic count, inventory, etc. Fits palm of hand, counts one for each pressure of thumb lever, resets to zero by turning knob.

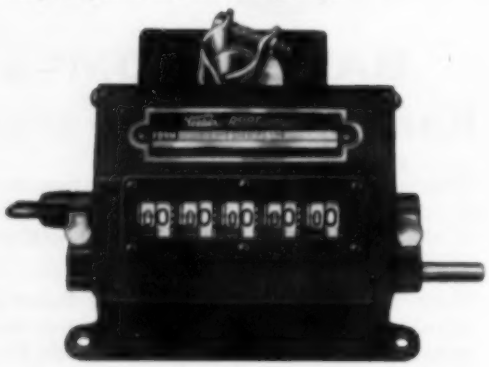
Insist on Standard

VEEDER-ROOT COUNTERS

from your Industrial Supply Distributor

ELECTRICAL COUNTING

These remote-indicating counters bring your production machines as close as your office wall. AC or DC, they can be connected in series with any simple switch, and will transmit production figures *instantly* over any distance. May be panel-mounted in groups.



CONTROLLING

Set it for the exact number of turns, pieces, or operations required . . . and this Predetermining Counter will control the run *exactly* . . . preventing over-runs and shortages. When the predetermined number is reached, counter will light a light, ring a bell, or actuate a stop-motion.

IN SUM: *If it can be counted or controlled . . . count on Veeder-Root to do it. Get in touch with your Industrial Supply Distributor for standard counters for application to your production machines and processes. And get in touch with Veeder-Root for counters to be built into original equipment.* **Veeder-Root Inc., Hartford 2, Connecticut.**

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a tough, resilient, corrosion resistant alloy . . . is a vital part of our daily living . . .

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WRITE FOR BOOKLET

behind the scenes

Award Stirs Pride

A. O. Schaefer, president of the American Society for Metals, stood and lightly tapped his water glass. A hush settled over the grand ballroom at Cleveland's Hotel Statler, where a distinguished audience had gathered to attend the society's first annual award luncheon. If one had glanced surreptitiously at one's calendar watch, one would have noted that it was an hour past noon on Tuesday, Oct. 9, 1956, and precisely 69 years after the appearance of Olber's comet.

The speaker's table was laden with silver and flanked by high brass, in which bronze complexions and iron gray hair—well, we are certainly running *this* into the ground. Let's start over. The speaker's table was graced by industrialists, public servants, executives, scientists and journalists, among whom was STEEL's editor-in-chief, Irwin H. Such. Mr. Such was invited to attend because Allmetal Screw Products Co. Inc., Garden City, N. Y., planned to present an award for editorial achievement to STEEL. They did, too. They handed Mr. Such a plaque bearing the following inscription: "Award for editorial achievement to STEEL in recognition of contributions made toward improved communication of important new developments in stainless steel; and for contributions toward higher professional standards in industrial trade journal content."

The article in question was "How To Form Stainless Steel," which was prepared with the help of the Crucible Steel Co. of America., Pittsburgh. It ran in STEEL on Nov. 14, 1955.

Fabulous Show

The 38th National Metal Exposition at Cleveland's Public Hall two weeks ago really was a most astonishing and inspiring spectacle. If it astounded and intrigued a vapid old goat like Shrdlu, think of the effect it must have had on professional metal men from all over the world! Any attempt to review and evaluate it in anything less than two volumes would be a waste of the reviewer's time and an affront to his readers. By the way, did any of you estimate the total number of miles of radiant tube Surface Combustion Corp. (Toledo, O.) had installed in its furnaces since 1934? A traveling light was the tip-off. All you had to do was figure how far the light traveled in a given time, and you were in like Flynn. We hoped the winner would be a member of our "Behind The Scenes" puzzle club, so we could bask in a little reflected glory. As soon as somebody finds out, please let us know.

Clean Living Pays Off

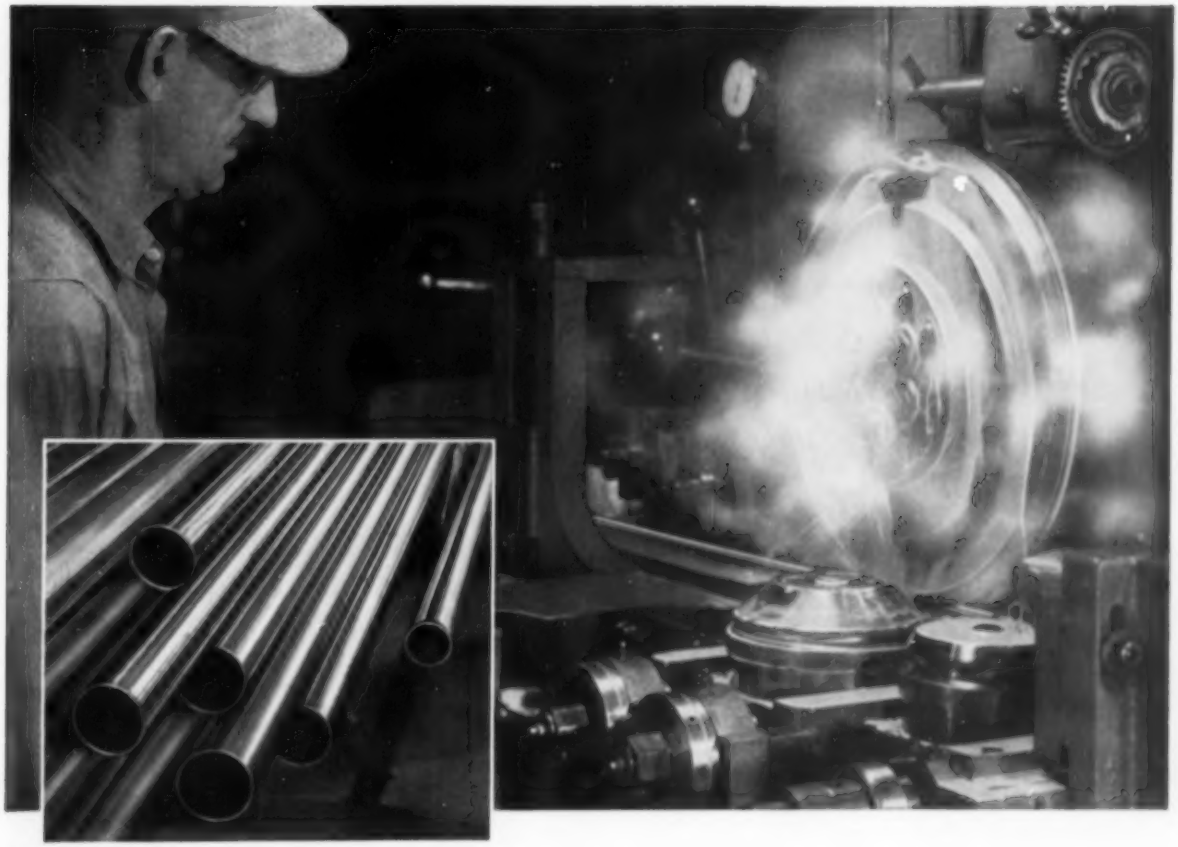
Speaking about somebody. Somebody sent us a clipping of an ad STEEL placed in *Advertising Age*, Oct. 1, 1956. The caption was "How To Evaluate a Business Paper's Readership by Knowing More About the Readers," and one of the illustrations showed a group of businessmen in conference. Most of them were holding cigarets or cigars, and ash trays were set strategically about the table. Somebody had drawn crosses over the offending items, and stamped this message: "Why advertise tobacco when the more people spend for smoke the less is left for your more worthy and serviceable products?" Additional copy advised us to avoid all reference to and the use of tobacco, liquor, coffee, tea and colas.

The leaflets were signed Howard B. Bishop, Human Engineering Foundation, Summit, N. J., and he is mighty serious about it. "A better way of life," Howard declares, "consists in exercising self-control and self-denial . . . By so doing you will save $400 per year, enjoy better health and live longer."

When you come right down to facts, you can't deny that Mr. Bishop has a point. It is not for us to get involved in questions involving mind, matter and morals—but there is one tiny point that begs an answer: Suppose you save that money, grow disgustingly healthy, and live longer by observing the conditions just mentioned. How are you going to blow the $400?

Shrdlu

(Metalworking Outlook—Page 39)



IN ELECTRIC-WELD PIPE AND TUBE MAKING

Yoder leads the way

to higher speeds and quality at lower cost

In the short period from 1938 to 1955, the production of electric welded pipe and tubing grew from 269,000 tons to over 3,000,000 tons. This phenomenal rate of growth—over two and one-half times faster than that of the pipe and tube making industry as a whole—to a large extent resulted from a series of important improvements in tube mill design, all introduced by Yoder.

First came the Yoder rotating welding transformer, in 1938. The economic and other benefits conferred by this epoch making innovation were further augmented by other technological advances scored by Yoder in the years that followed. The result was that electric-weld pipe and tube making became the child prodigy of the fast growing pipe and tube making industry.

Latest, and perhaps the greatest, of these developments is the cold forming and induction welding at high speeds of *aluminum, magnesium, brass, nickel, monel, and other non-ferrous metals and alloys.* This process is especially economical for making light and medium gauge tubes in sizes up to 8 in. dia. More and more leading non-ferrous metal producers and fabricators are installing these mills.

More complete information about this and other interesting Yoder developments in pipe and tube mill equipment may be had merely by asking for any of the following publications:

- ☐ Resistance-Weld Mills for making Steel Tubing up to 4" diameter.
- ☐ Induction-Weld Mills for making Non-ferrous Tubing.
- ☐ Resistance-Weld Mills for Steel Pipe up to 24" diameter.

THE YODER COMPANY

5502 Walworth Avenue **Cleveland 2, Ohio**

ENGINEERING YODER MANUFACTURING

PIPE AND TUBE MILLS—Electric Weld

ROTARY SLITTING LINES

COLD ROLL FORMING MACHINES

Got a Production Problem?

...THAT NEEDS A PRESS NOW

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High-speed production tool

Here's a NEW 1-ton hydraulic

MULTIPRESS®

- Gives up to 750 ram strokes per minute.
- Ram pressures adjustable up to 1-ton.
- Automatic pressure reversal.
- Completely self contained.
- Your present tooling easily adaptable.
- Dual manual safety control.

Only $395.00

F.O.B. Factory. Subject to prior sale

CUTS YOUR TOOLING COSTS ON SMALL AND LARGE QUANTITY LOTS—Many shop operations can be simplified because you can move Multipress quickly and easily from department to department, wherever a press is needed. And, because Multipress can be moved around, it can be stored in your tool crib complete with tooling setup until the particular production job is run again.

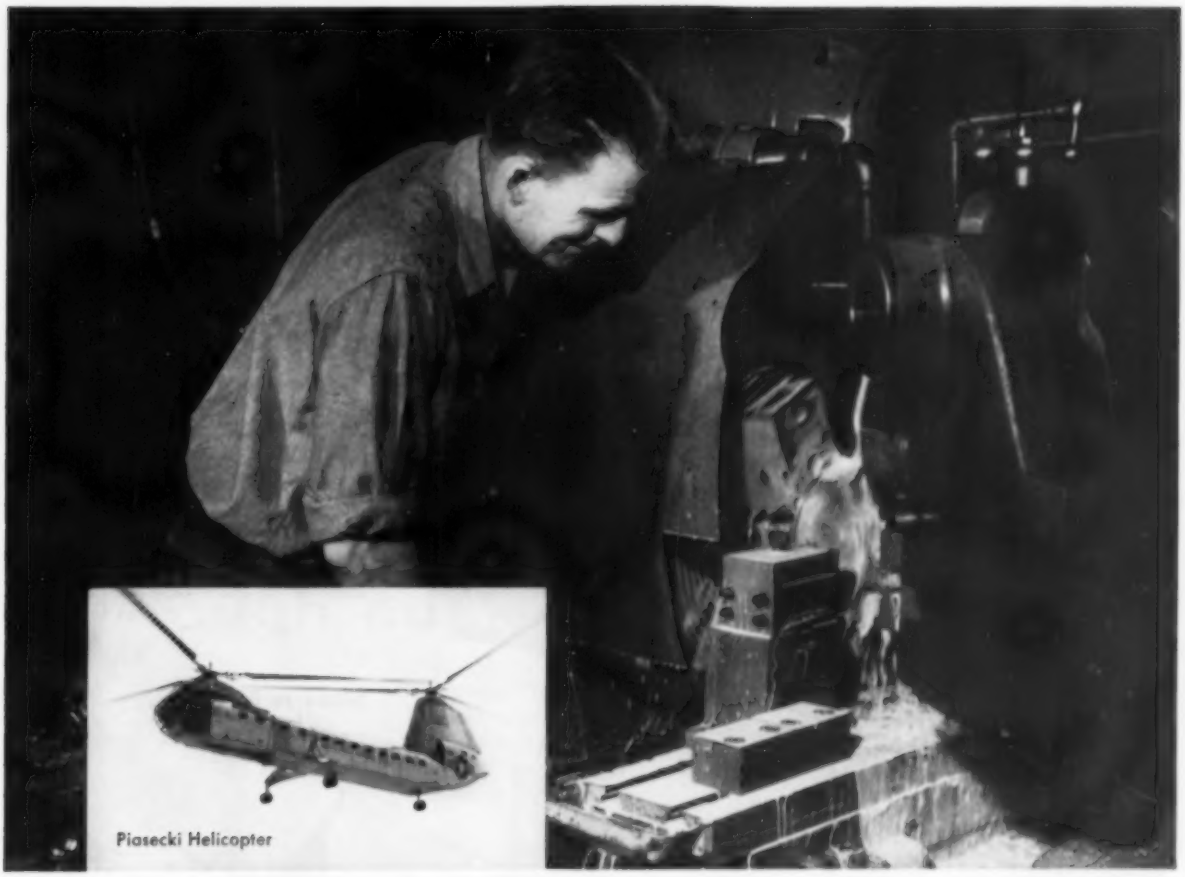
SIMPLIFIES AUTOMATIC OPERATIONS—Multipress is specially engineered for automation. It can be mounted simply around dial tables and indexing fixtures to keep your tooling costs to an absolute minimum. The Multipress controls can be actuated electrically, pneumatically or hydraulically from external sources making it easy to interlock the Multipress in with other automatic production operations.

IDEAL FOR CONTINUOUS LINE PRODUCTION—Two or more Multipress units can be easily set up side by side to handle straight line production work. Surprisingly small bench area is needed for line production work because of the compact, operator-engineered design developed in the 1-ton Multipress.

WRITE NOW

DENISON ENGINEERING DIVISION
American Brake Shoe Co.
1180 Dublin Road Columbus 16, Ohio

DENISON HydrOILics



Sun's Heavy Duty Emulsifying Cutting Oil excels on high-alloy aircraft steels

S.E.C.O. Heavy Duty handles all machining jobs requiring an emulsifying cutting oil. Piasecki Helicopter's large job shop at Morton, Pa., found this out three years ago when S.E.C.O. HD* replaced two expensive heavy-duty soluble oils in machining fan hubs.

Extremely versatile and moderately priced, S.E.C.O. HD has been doing an exceptional job in cutting a variety of high-alloy aircraft steels for Piasecki.

For more information about S.E.C.O. HD, see your Sun representative. Or write to SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-10.

WRITE FOR FREE TECHNICAL INFORMATION

- *Cutting and Grinding Facts*
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INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

Philadelphia 3, Pa.

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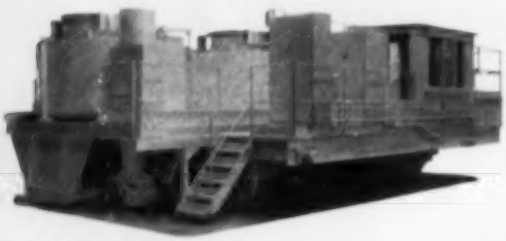
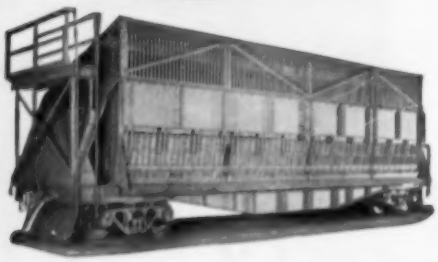
COAL TO COKE VIA ATLAS CARS

Making coke is a specialized business, and requires special equipment like the cars below. Coke plant operators prefer Atlas Cars because they are dependable.

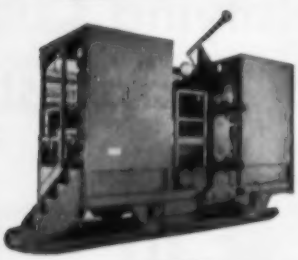
3 HOPPER COAL CHARGING CAR



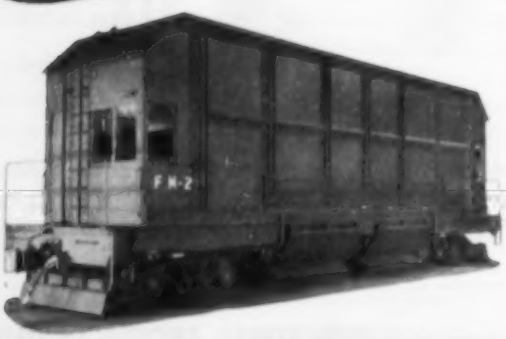
COKE QUENCHER



HYDRAULIC DOOR MACHINE



40-TON COKE TRANSFER CAR



THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

LETTERS
TO THE EDITORS

Article Motivates Kudos

No. 8 in your 1956 Program for Management series, "Motivating Men To Produce More" (Sept. 24, page 105), is particularly pertinent. Please send a copy for my files.

T. C. Bamford
Superintendent
Electric Controller & Mfg. Co.
Cleveland

We read with interest your article on motivation for more production and would appreciate receiving 12 copies.

Albert Handler
Director of Purchases
Mattel Inc.
Los Angeles

The management series has been greatly appreciated in our company and has been of particular interest to me. I would like to take advantage of your offer of an extra copy of this article.

Herman H. Sanderson
Chief Draftsman
Barry Controls Inc.
Watertown, Mass.

Stake in Elections

I was impressed with the pertinency and timeliness of the editorial, "Get Out the Vote" (Sept. 24, page 63). I would appreciate receiving a dozen copies which we will post in our manufacturing plant.

I believe we all have a stake in elections, and all of us need the sort of reminding which appeared in your editorial.

David H. Ledford
Director of Personnel
Camcar Screw & Mfg. Co.
Division of Textron American Inc.
Rockford, Ill.

Reader Wants Copies Rushed

Received my Oct. 8 copy of STEEL today and was pleased to read the article, "Steel Founders Eye Future" (page 64). Please rush six reprints to me.

E. Veselik
Vice President
Calumet Steel Castings Corp.
Hammond, Ind.

Query from Wiremaker

We read your interesting article "Save with Shaped Wire" (July 16, page 132), but noted in the Letters to the Editors column of Aug. 6 (page 10) that you refer readers to American Steel & Wire Division, U. S. Steel Corp., Cleveland, and Alloy Metal Wire Division, H. K.

(Please turn to page 12)

American Tool Works Co.

smooth operator...

A hole is a hole is a hole—but American Tool's 32-speed Hole Wizard Radial Drill makes them with the speed and consistent accuracy that precision production demands. And Federal XLS Ball Bearings keep the vertical shifting mechanism functioning smoothly.

tough customer...

The powerful impact action of this Chicago Pneumatic Wrench makes child's play out of tightening and loosening the huskiest nuts and bolts. It pounds away from day to day with no sign of fatigue. Here, too, Federal Ball Bearings can "take it".

Chicago Pneumatic

so much of industry *turns* on FEDERAL ball bearings

Dependability is a proud word, especially when you apply it to machines. And wherever you find dependable machines—in home, office or factory—you're almost sure to find Federal Ball Bearings making their vital contribution toward smooth, trouble-free performance. 12,000 sizes to solve your anti-friction problems. Hundreds of types. Produced by a 50-year-old manufacturer of ball bearings exclusively.

When Federal Ball Bearings are part of so many things you *use*, shouldn't they be part of the things you *make*?

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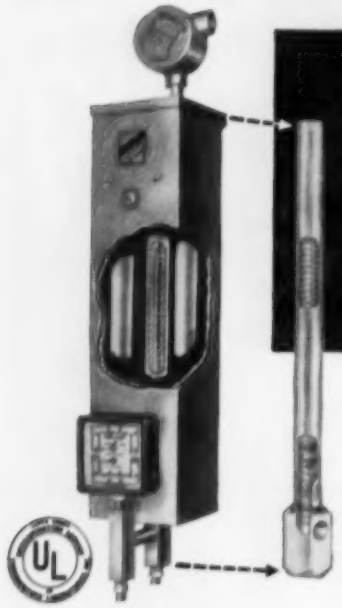
New! Ball bearing and engineering data! *175 pages full in* FEDERAL'S CATALOG! *To get your copy, just write us.*

Federal Ball Bearings

One of America's Largest Ball Bearing Manufacturers

What's New in paint heaters



Binks new DUALHEET paint heater has removable paint tract

Only Binks DUALHEET paint heaters incorporate the following features... features which insure easy maintenance and long, dependable operating life.

Lower maintenance costs
The paint tract is a heated chamber within the unit where the temperature of the paint is raised to 160°-180°F. It has no parts that are affected by the intense heat...a common cause of many paint heater failures. Easy removal of the paint tract for periodic inspection and cleaning saves both time and money. Should major servicing ever be required, a new, low-cost paint tract can be installed in less than 5 minutes.

Lower operating costs
Heating finishes with a Binks DUALHEET paint heater reduces need for thinners. With higher solids content, one pass of the spray gun applies greater film thickness with less overspray and provides greater coverage per gallon. Less atomizing air pressure is needed. Fewer rejects ...sags and runs are virtually eliminated.

Simple installation
A Binks DUALHEET paint heater fits easily into existing cold spray process systems either as a portable or stationary unit. Electrically heated, it requires no special auxiliary heating attachment or space. Available in two production-rated capacities—15 or 8 gallons per hour. May be used with pressure tanks, material handling pumps or paint circulating systems.

Simple operation
Operators will experience no difficulty in shifting from cold to hot spray process.

For complete information ask your local industrial distributor for Binks DUALHEET Bulletin or write direct to the address below.

Ask about our spray painting school
Open to all...NO TUITION...covers all phases

661

Binks
EVERYTHING FOR SPRAY PAINTING

GUNS

SPRAY BOOTHS

COMPRESSORS

Binks Manufacturing Company
3122-30 Carroll Ave., West, Chicago 12, Ill.

REPRESENTATIVES IN PRINCIPAL U.S. & CANADIAN CITIES · SEE YOUR CLASSIFIED DIRECTORY

LETTERS

(Concluded from page 10)

Porter Company Inc., Prospect Park, Pa.
Since we are one of the leading producers, why don't you mention us?

E. V. Creagh, Manager
Advertising and Sales Promotion
Page Steel & Wire Division
American Chain & Cable Co. Inc.
Bridgeport, Conn.

• *Our files show that there are more than 30 producers of shaped wire. STEEL's readers will be glad to know that Page Steel & Wire Division is among the largest.*

Interested in Special Alloys

We have found the article, "Gain Quality, Trim Costs with Special Alloys" (Oct. 1, page 156), especially interesting and informative. Kindly send 12 copies.

Albert Klingelhofer
Albert Klingelhofer Machine Tool Corp.
Kenilworth, N. J.

Brainstorming in Michigan

Having just spent some profitable minutes with the article, "Ideas for Industry" (Apr. 23, page 105), I'd like 25 copies to give to members of our staff and Commission. I would appreciate your sending these right away so we can start making use of them. I'd like to distribute them a couple of days before the October meeting of the Commission.

Don Weeks
Director
Michigan Department of Economic Development
Lansing, Mich.

Valuable Contribution

In the Oct. 1 issue, you have included the Metal Selector insert. I would appreciate receiving a copy.

In my opinion, this section is a valuable contribution and should be of wide interest to your readers.

O. E. Cullen
Chief Metallurgist
Surface Combustion Corp.
Toledo, O.

This appears to be a valuable tabulation, and we would appreciate receiving four copies.

D. Lundquist
Engineering Supervisor
Marlin-Rockwell Corp.
Jamestown, N. Y.

Putting Lead Into Steel

On page 100 of your Aug. 13 issue, you have an article, "New Technique: Lead in Steel Forgings." In this article (under the paragraph of "Top Secret") you mention the Inland process of getting lead into steel which was described in STEEL, Oct. 25, 1954, p. 150. We would like a copy of this article.

Charles P. Reymann Jr.
President
Atlantic Foundry Co.
Akron

• *We have forwarded a copy of the article, "Adding Lead to Steel . . . Here's How It's Done." This article disclosed (for the first time) details of the process used only by Inland Steel Co. and its licensees since the late thirties.*

SCRAMBLE! Thanks to the Distant Early Warning radar line, defending planes may have 4 to 6 hours' warning before a 600-miles-per-hour enemy jet bomber could hit United States key industrial cities.

Copper stands guard in the "DEW"

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Where electrical conductivity must not falter, where corrosion-resistance must not fail, even in blizzard or permafrost . . . *only copper will do!*

And where, as in the logistics of DEW line construction, *miniaturization* is the only answer, *copper is indispensable.*

In the Nation's defense or her industry's advance, copper is essential to products that are essential to progress.

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RESEARCH ASSOCIATION
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top quality sheet

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1906-1956

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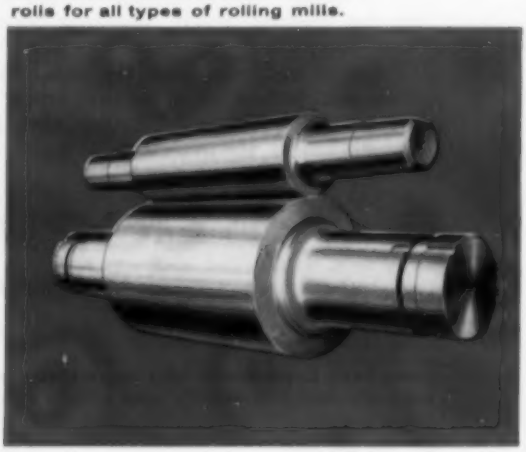
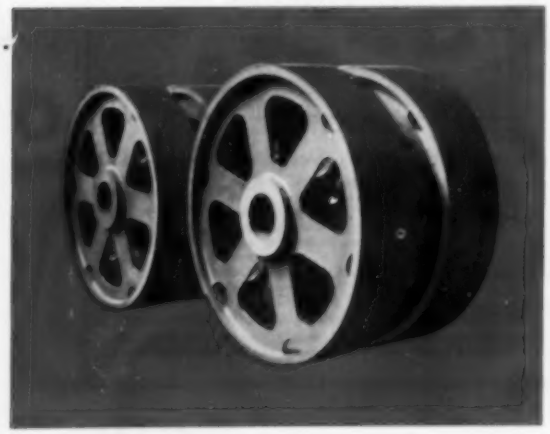


CONTINENTAL 80-inch continuous hot strip mill in the Gary Sheet and Tin Mill of the United States Steel Corporation.

WELDMENTS—fabricated steel plate, or cast-weld design.



CASTINGS—carbon and alloy steel castings from 20 to 250,000 pounds.

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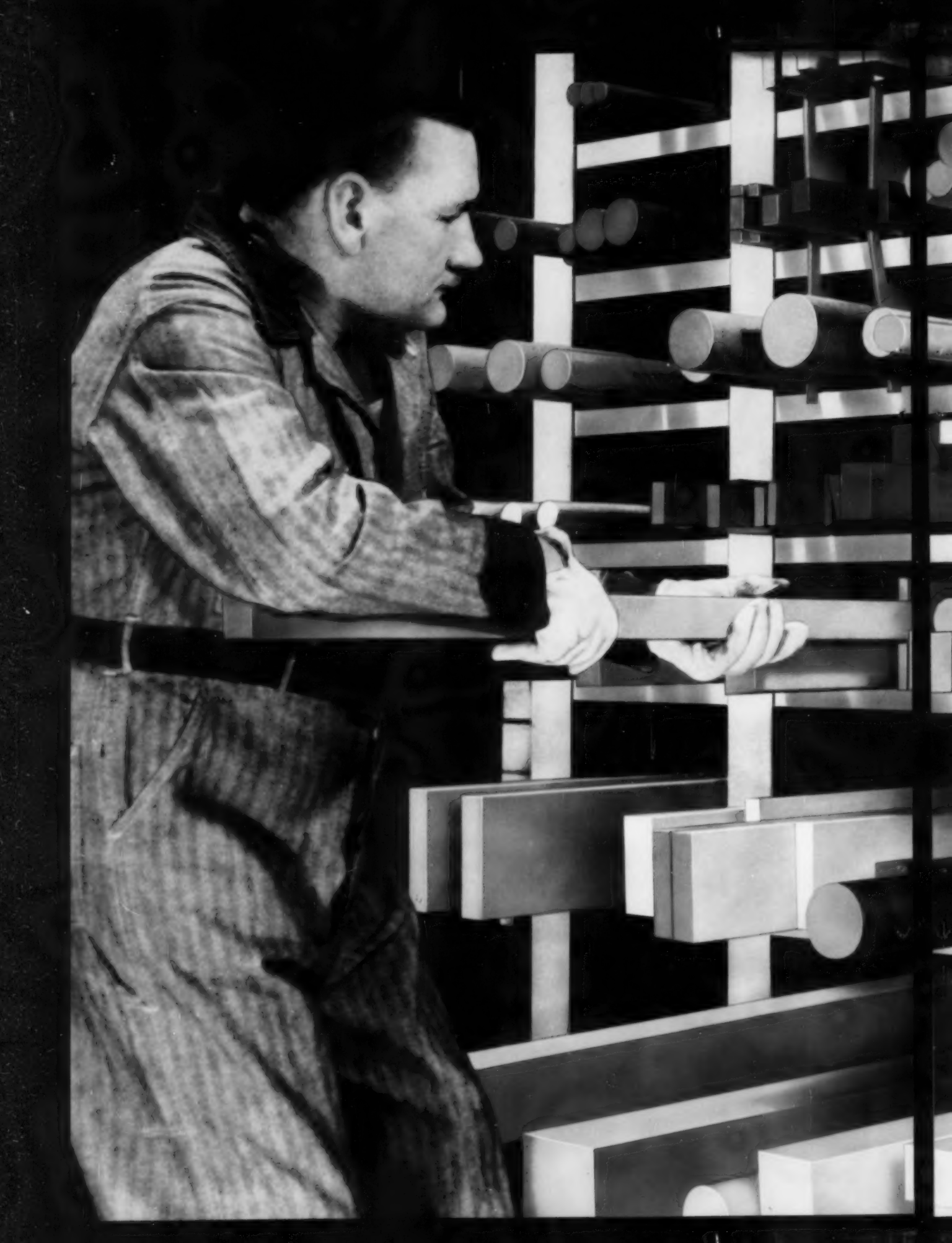

Take this *new look* at what you get when you call *Carpenter*

There are many reasons why it isn't profitable to carry too large a stock of specialty steels in your shop. Perhaps excessive *manpower* is tied up in handling large inventories . . . maybe you are trying to free *dollars* for more productive use . . . or cut down on worrisome *paper work*. If any of these is a problem, there is a way out!

But it hinges on the *ability* of your steel supplier to meet your day-to-day specialty steel needs, quickly and without hesitation.

For example, here's how Carpenter is doing everything possible to help you: We've gone all out in building up ample stocks of tool, stainless, and alloy steels. You can expect the closest kind of cooperation from your Carpenter representative . . . as well as the order desk people, warehouse crew, and the office staff. All with the idea of working with you to *hold down* specialty steel costs and improve your results. Call your nearest Carpenter Mill-Branch Warehouse, Office or Distributor, any time. The Carpenter Steel Company, Dept. 221, Reading, Pa.

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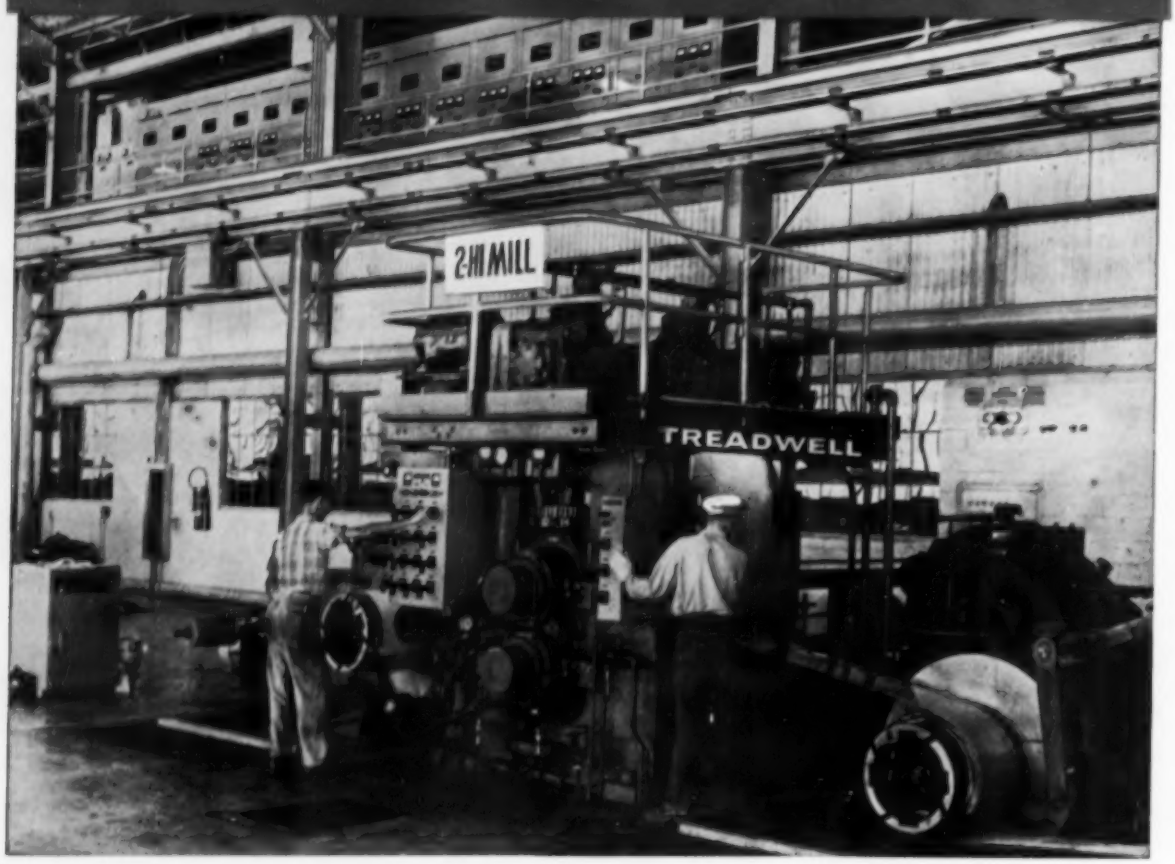
Mill-Branch Warehouses, Offices and Distributors in Principal U.S. Cities

Treadwell



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No matter how sly their origin, these undetected situations inevitably get out of hand and into cost figures. Tools are damaged; production time is lost. Parts pile up in scrap, or worse, get by inspection and fail in the hands of the customer.

New Brush METAL MONITOR takes the guesswork out of metal identification.

Most plants are surprisingly susceptible to these cases of "mistaken identity" which cost millions of dollars every year. *But now these wastes can be eliminated!*

New Shop Tool Identifies Metals

Brush Electronics offers a new instrument, the Brush METAL MONITOR,* which will detect variations from approved metal specifications at any stage of processing. It works on ferrous or non-ferrous metal, is nondestructive, won't mar finished surfaces. And it's portable, easy to use. Any worker can check any metal anywhere in the shop. The METAL MONITOR prevents losses due to the use of the wrong metals.

How It Works

Metal checks are easy to conduct. The METAL MONITOR probe is held momentarily on a sample of metal known to have the desired structure and composition and the operator obtains an immediate reading. He then holds the probe on the piece to be checked. If the reading is the same, the metal is the same . . . if the reading varies, it's the wrong metal.

Write for this introductory booklet on the new Brush METAL MONITOR now!

To get the complete facts about this fast, accurate instrument, send for your free copy of a brand-new booklet. It describes the Brush METAL MONITOR in detail, explains how it will save money for your company.

*T. M.

BRUSH ELECTRONICS COMPANY

3501 Perkins Avenue, Cleveland 14, Ohio

BRUSH 6 ELECTRONICS

DIVISION OF CLEVITE CORPORATION

COORDINATED PRODUCTION safeguards material quality from ore mine to steel billets delivered to our Bolt and Chain Division fastener plant as shown at top, left. This complete metallurgical control makes certain that each fastener type is made from the analysis best suited to meet final application requirements.

MODERN FACILITIES mean absolute uniformity throughout any given type and size fastener, in any quantity, every time. This rigid adherence to standards is the backbone of dependable performance. Photo, top, right, shows one of a battery of automatic high-speed, heavy-duty nut formers.

VAST EXPERIENCE extending over a century of fastener manufacture backs every Republic fastener produced. This know-how, accumulated and passed on by skilled craftsmen and designers has evolved 20,000 standard and 8,000 special types and sizes, currently available to meet your requirements.

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The case for
FASTENER SELECTION

3-Way Quality Control assures maximum performance fasteners

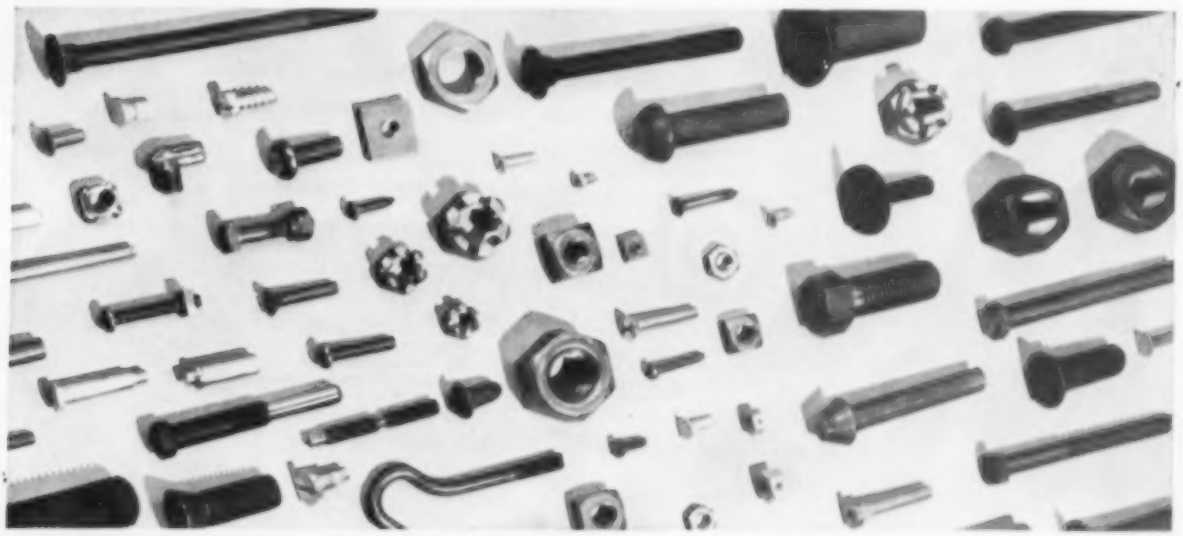
It's a fact: Performance is a direct function of quality. And in fastener application, where everything depends on holding power, you owe it to your product and reputation to specify the best—Republic Bolts and Nuts.

Republic's reputation for reliability is based on precise control of quality, from raw ore to finished fastener product. As a basic producer of steel, we can specify and produce the exact grade of alloy or carbon steel to assure maximum performance in the fasteners it will form.

Beyond outstanding material quality, Republic fasteners are absolutely uniform throughout any given type and size. Batteries of modern machines, double checked by comprehensive testing procedures, maintain exacting standards regardless of production quantity.

Finally, to the finest materials and methods, Republic adds priceless experience in fastener manufacture. Each of our 20,000 standard plus 8,000 special types and sizes is produced by skilled operators drawing on a fund of "know-how" over a century in depth. This same reservoir of experience enables Republic to undertake volume production of headed and threaded items made to your own particular specifications.

Whatever your requirements, maximum performance Republic fasteners will give your assemblies the protection they deserve at no more cost than other brands. So don't just order fasteners, *select* Republic and be sure of the best. Contact your local Republic sales office, or mail the coupon for full information.



MAXIMUM PERFORMANCE FASTENERS are the logical result of Republic's quality protected materials, precision manufacturing equipment and time-tested methods. In addition, these factors make Republic your best choice for volume production of highly specialized headed or threaded items, made to your exact specifications.

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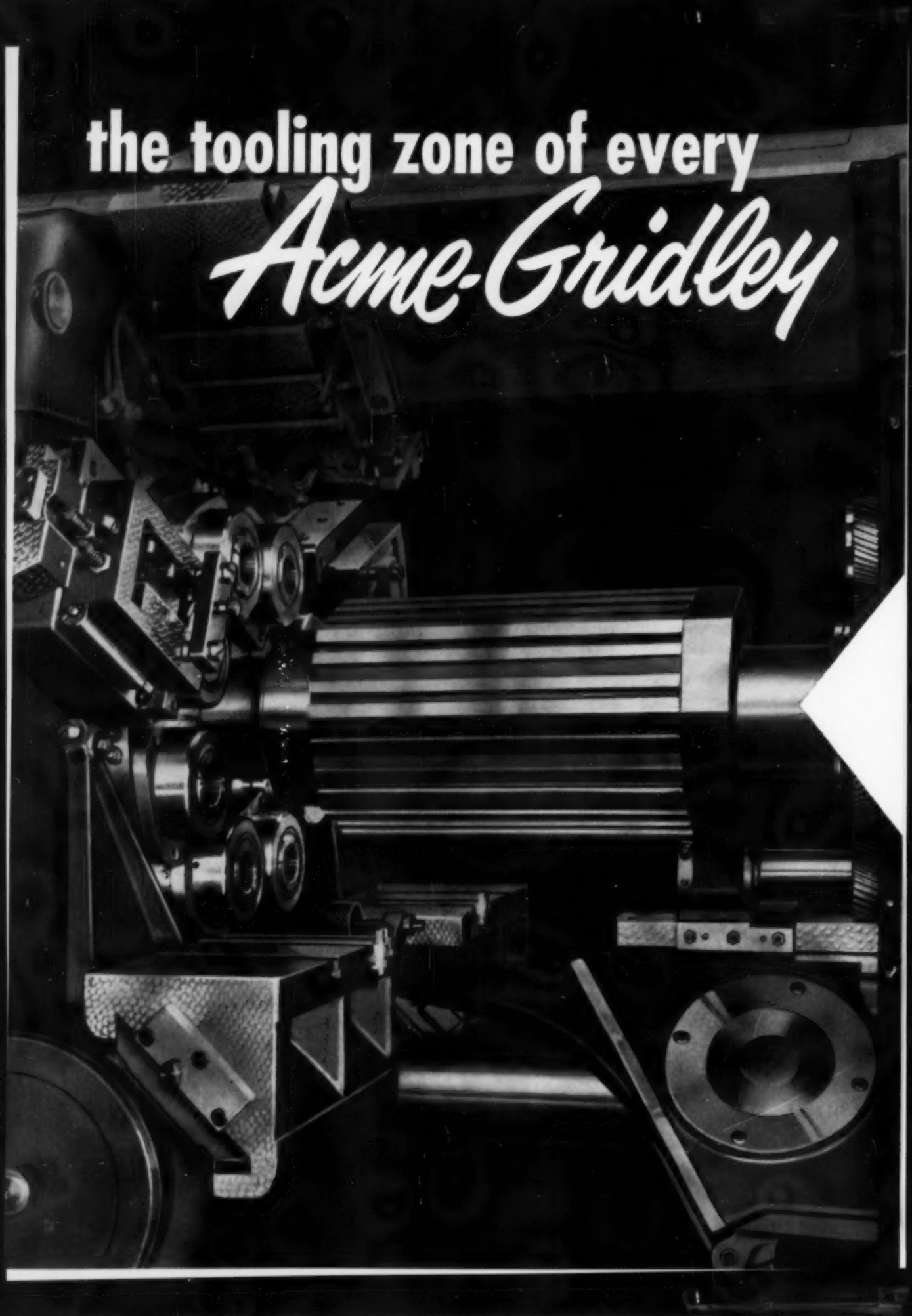
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—open . . . for business!

Since the primary advantage of a multiple-spindle automatic is to make it possible to complete more operations in a single setup, accessibility to and plenty of space in the tooling zone, *to apply the maximum number of tools*, is especially significant.

When you want to speed up production, perform unusual operations, or to get a finer finish, let a National Acme tooling engineer apply his COMPLETE LINE experience in helping you select the attachments to perform these operations on your machine.

Combination Cross Milling and Drilling Attachment

Worm or Thread Generating Device

Threading or Tapping Tool

LET US TELL YOU MORE ABOUT *Acme-Gridley* BASIC DESIGN

This is but one of many BASIC DESIGN features which are responsible for Acme-Gridley's outstanding performance records. May we send you additional information? Or, better yet, let us send a representative to discuss possible production short cuts with you.

National Acme

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SALES OFFICES: • Newark, N. J. • Chicago, Ill. • Detroit, Mich.

Time exposure shows continuous motion of red-hot ingot as it travels through roller.

"Never replaced screwdown or nut using Cities Service E. P. Lubricants!"

Circulating System located on floor below mill, uses Cities Service E. P. Oils. Mill operates 160 hours a week, has never had lubrication failure.

Dial Gauges Accuracy to 1/32 of an inch. It is used by operators in the pulpit, who control the mill's 7000 horsepower and shape its steel to unusually fine tolerances for a blooming operation.

Ever since the installation of this blooming-slabbing mill at Pittsburgh Steel Company's Monessen Works, Cities Service E. P. Oils have been used for lubrication.

During that time, over 4,000,000 tons of steel have been run through the mill's huge rolls . . . but never once has the firm found it necessary to replace the screwdown, nut or any bearing due to lubrication failure.

A Pittsburgh Lubrication Engineer says: "Oils stay with the parts that must be lubricated and never give us a problem."

Where an inferior lubricant might be wiped away during the regular operation of the mill, Cities Service E. P. Oil withstands continuous operation. In addition, the oil can be centrifuged and yet not lose its additive.

Pittsburgh Steel is one of an increasing number of steel manufacturers who report outstanding results with Cities Service Lubricants. A Cities Service Lubrication Engineer will be happy to supply all the reasons. Or, if you prefer, write Cities Service Oil Company, Sixty Wall Tower, New York 5, New York.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

CALENDAR
OF MEETINGS

Oct. 22-23, American Coke & Coal Chemicals Institute: Annual meeting, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 711 14th St. N.W., Washington 5, D.C. Secretary: S. S. Robinson.

Oct. 22-24, Systems & Procedures Association of America: International meeting, Bellevue-Stratford hotel, Philadelphia. Information: J. A. MacQueen, general chairman, 1956 International Systems Meeting, Department P, Alan Wood Steel Co., Conshohocken, Pa.

Oct. 22-25, Society of Industrial Packaging & Materials Handling Engineers: Technical short course and national protective packaging and material handling exposition, Kiel Auditorium, St. Louis. Society's address: 111 W. Jackson Blvd., Chicago 4, Ill. Managing director: Charles J. Carney Jr.

Oct. 22-26, National Industrial Exposition & Management Conferences: Detroit Artillery Armory, Detroit. Information: Denham & Co., 925 Book Bldg., Detroit 26, Mich.

Oct. 22-26, Production Engineering Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Oct. 23, American Society of Safety Engineers: Annual meeting, Conrad Hilton hotel, Chicago. Society's address: 425 N. Michigan Ave., Chicago. Secretary: J. B. Johnson.

Oct. 24-25, American Society of Mechanical Engineers: Fuels conference, Sheraton-Park hotel, Washington. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: C. E. Davies.

Oct. 25-26, Society for Advancement of Management: Annual fall conference, Hotel Statler, New York. Society's address: 74 Fifth Ave., New York 11, N. Y. Executive vice president: Harold R. Bixler.

Oct. 25-26, American Supply & Machinery Manufacturers' Association Inc.: Industrial distribution forum, William Penn hotel, Pittsburgh. Information: W. B. Thomas, Hunter-Thomas Associates, Cleveland, O.

Oct. 25-26, Drop Forging Association: Fall industry meeting, Biltmore hotel, New York. Association's address: 419 S. Walnut St., Lansing 33, Mich. Secretary: Richard L. Marcus.

Oct. 28-31, American Gear Manufacturers Association: Semiannual meeting, Edgewater Beach hotel, Chicago. Association's address: One Thomas Circle, Washington 5, D.C. Executive secretary: John C. Sears.

Oct. 28-31, American Institute of Wholesale Plumbing & Heating Supply Associations Inc.: Annual meeting and business conference program, Sheraton Park hotel, Washington. Institute's address: 402 Albee Bldg., Washington, D. C. Executive secretary: George T. Underwood.

Oct. 29-30, Refractories Institute: Fall meeting, Homestead Hot Springs, Va. Institute's address: 1801 First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary: Avery C. Newton.

Oct. 29-31, Truck Body & Equipment Association Inc.: Annual meeting, Sherman hotel, Chicago. Association's address: 1616 K St. N.W., Washington 6, D.C. Secretary: Arthur H. Nuesse.

Oct. 29-Nov. 1, American Institute of Steel Construction Inc.: National convention, Greenbrier, White Sulphur Springs, W. Va. Institute's address: 101 Park Ave., New York 17, N.Y. Secretary: M. Harvey Smedley.

Oct. 29-Nov. 1, Wire Association: Annual meeting, William Penn hotel, Pittsburgh. Association's address: 453 Main St., Stamford, Conn. Secretary: Richard E. Brown.

Whether it's the x-ray spectrograph utilized for chemical analysis . . .

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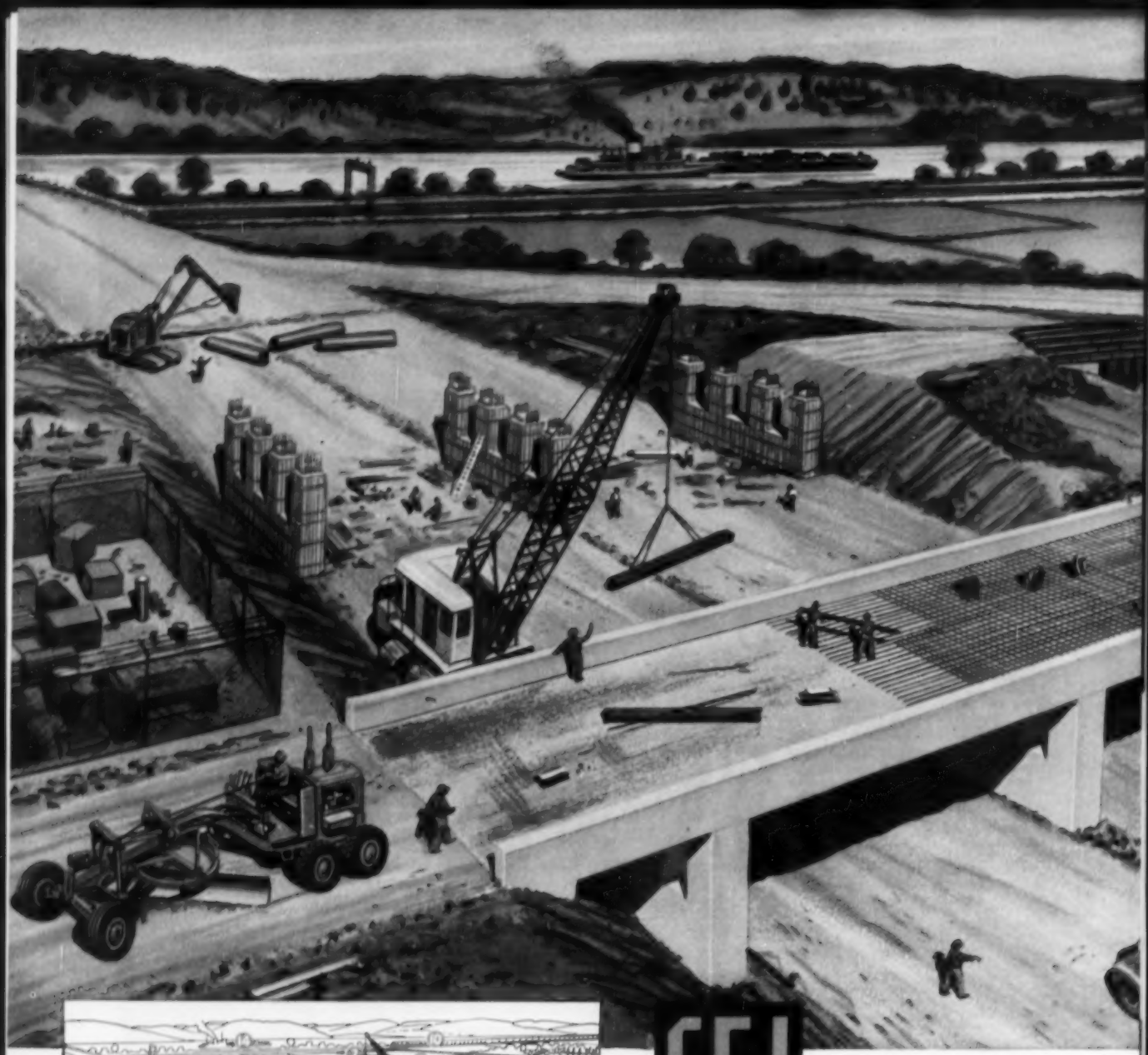

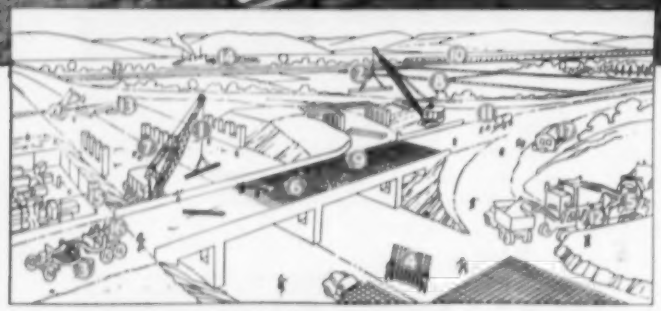

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2. Wickwire Wire Rope Slings
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6. CF&I Reinforcing Bars
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11. Claymont Heads
12. Claymont Fabricated Steel Parts
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14. Claymont Alloy Steel Plates
15. Realock Chain Link Fence
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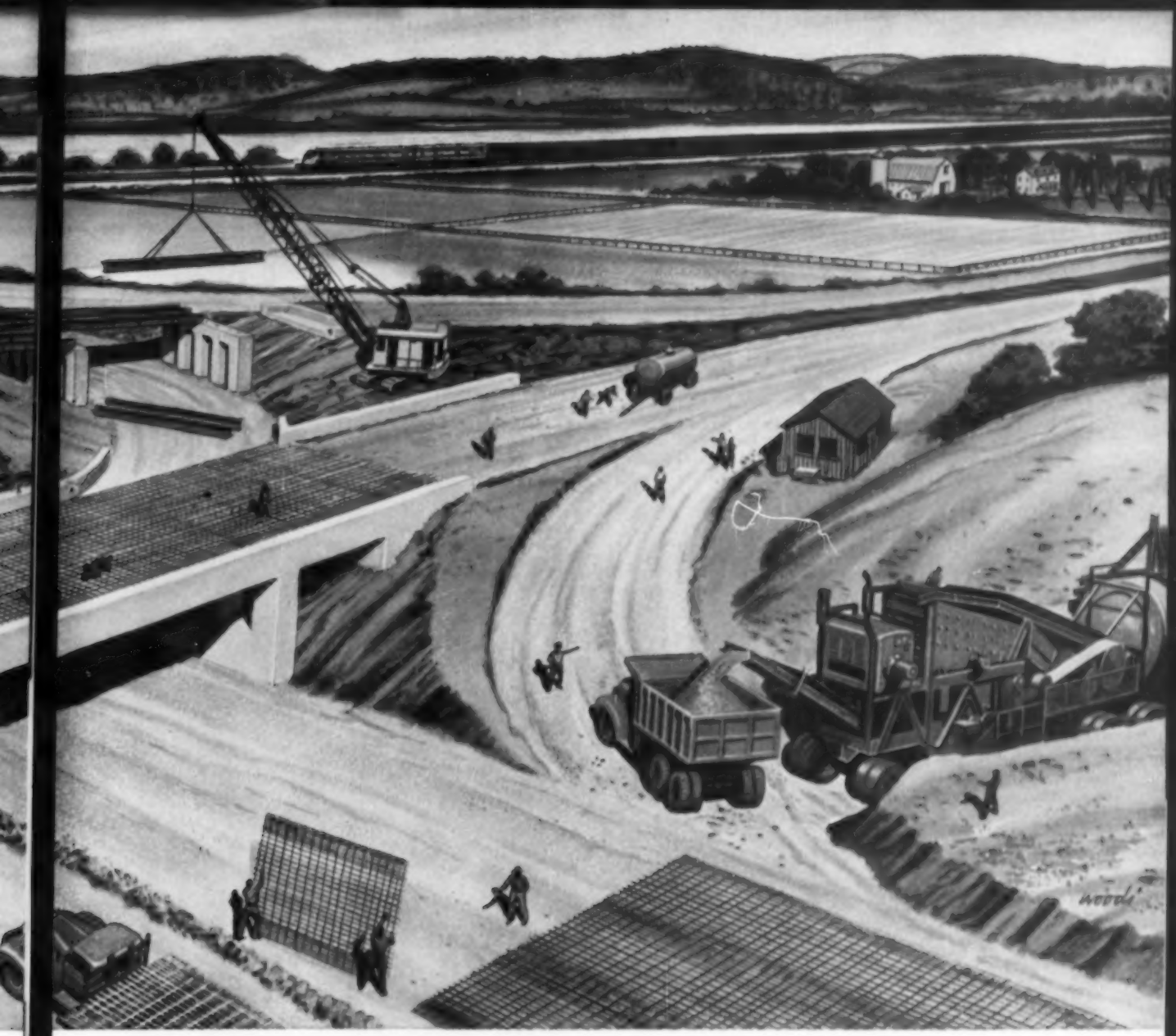

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Have you been bogged down with paper work lately, thereby missing a chance to save money by streamlining your wire buying?

Your American Steel & Wire representative can be of immense help if you give him a call. For example, he may be able to suggest more economical buying units or packaging specifications, or find one type of wire that will do the job of two. Turn him loose in the plant, because he might find a lower cost way of doing the job —with a better product the result.

At AS&W, we *use* a lot of wire in our own plants, and have learned many little tricks that are yours for the asking. Just call your American Steel & Wire representative.

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UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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USS

AMERFINE —*high quality fine wire.*
AMERSPRING —*music steel spring wire.*
AMERTEMP —*heavy-duty oil-tempered wire.*
AMERLOY —*alloy heading wire.*
AMERHEAD —*uniform heading wire.*
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UNITED STATES STEEL

are you running hard...

Conservative studies of growth potentials and long range trends, by both industry and government, show clearly that markets are already outrunning the labor supply for industrial production. The pace will get increasingly faster as our growing population demands more goods and services.

Those companies which stay in the race will do so by stepping up their productivity per man hour, and planning their capital expenditures accordingly. They will not stumble over the problem of machines displacing men, because they know there will not be enough labor to fill all the jobs created in the next ten years.

Avey production machines have already increased productivity per man hour, per square foot of plant space, and per dollar of invested capital in many plants. Their fast rate of return makes it profitable and pleasant to stay in the running.

▸ **production data:** This machine automatically rough and finish mills, drills, countersinks, and taps 260 hydraulic pump covers per hour. Operations include automatic gauging, probing, and insertion of bronze bushing in bore.

THE AVEY DRILLING MACHINE CO., CINCINNATI 1, OHIO

drilling, tapping, production machines

and losing ground?

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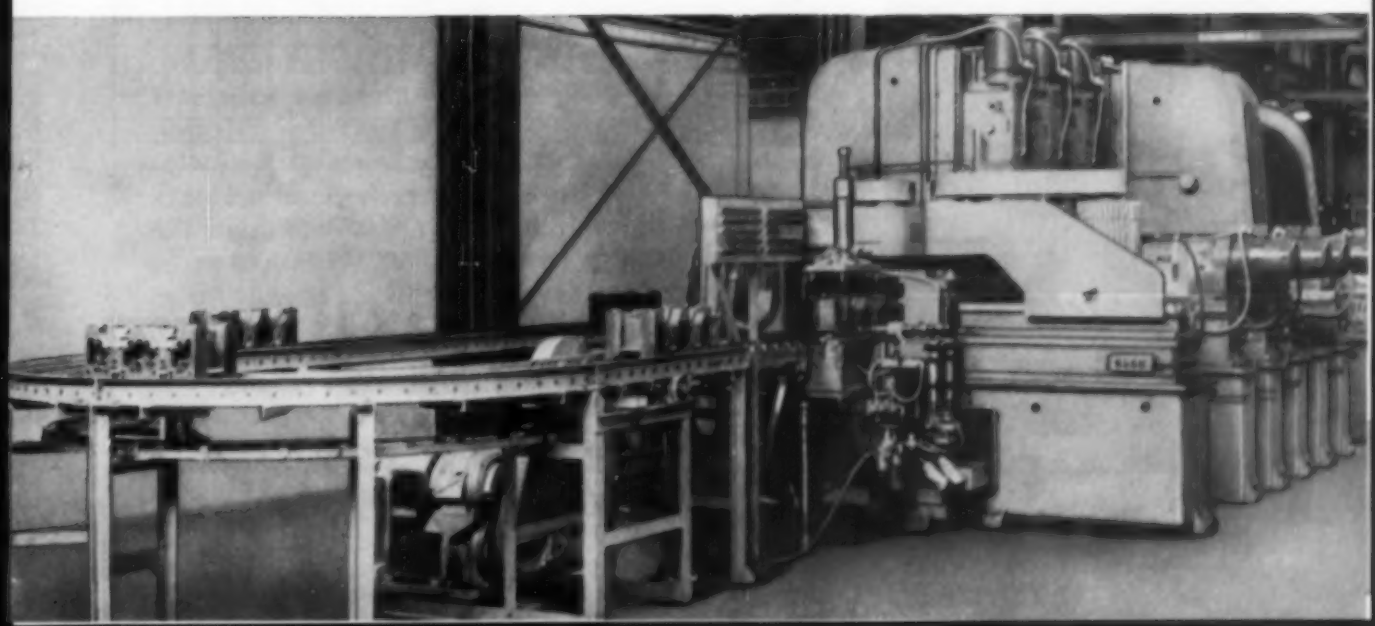


Lamson

1035 CAP SCREWS OFFER GREATER STRENGTH AT...

Less Cost!

If you are now using Full Finished Screws in your assembly operations it will pay you to consider substituting Lamson 1035 Double Heat Treated Cap Screws.

The extra relative toughness of Lamson 1035's enables you to use screws of smaller diameter, yet with equal, or greater, tensile strength.

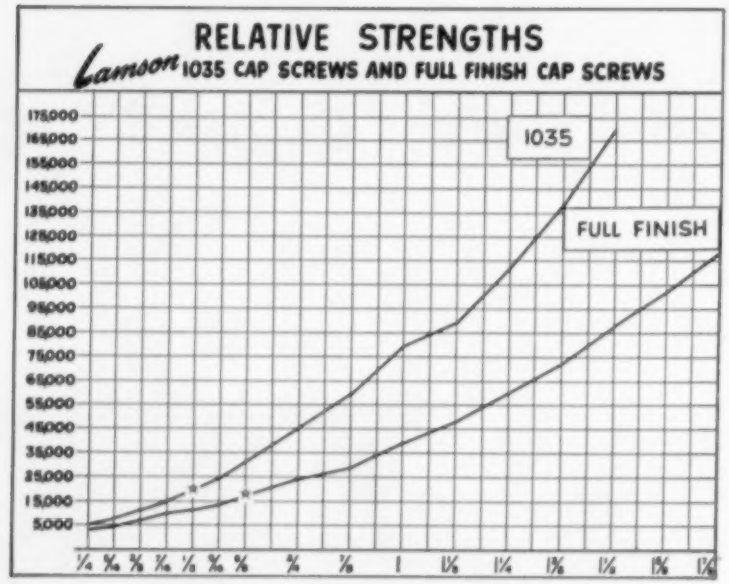
As an example of increased strength at less cost—on the chart below you will see that a ½"* diameter Lamson 1035 Cap Screw has greater tensile strength than a ⅝"* diameter Full Finished Cap Screw. This means savings in weight and size of assembly.

As for money savings—Lamson ½" x 2" 1035 Cap Screws are net priced at $5.45 per hundred as compared to $7.69 per hundred for the ⅝" x 2" Full Finished Screw. Proportionate savings can be made all along the line.

Lamson 1035 Double Heat Treated High Tensile Cap Screws have long been favorites where extra strength and durability is required.

To attain this extra strength, Lamson Cap Screws are first heat treated at about 1600°F. and then quenched. This imparts "hardness". Then the screws are "drawn", or re-heated, to between 900° F. and 1100° F. and then quenched in a special oil.

This results in a minimum tensile strength of 150,000 pounds per square inch.



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Caterpillar Tractor Co. Metallurgist T. H. Spencer inspects final drive pinion for D9 crawler tractor weighing 28 tons. Severe loading of this large pinion requires a steel with high case and core hardenability. Several years ago Caterpillar Tractor Co. found that simply by increasing the molybdenum content of AISI 8622 (to 0.30-0.40%), the desired properties were obtained at lower cost than was possible in any of the standard carburizing grades.

Caterpillar Tractor Co. improves case and core hardenability of carburizing steel by increasing molybdenum content

"Drive pinions in tractors must take very high torque loads," says T. H. Spencer, Metallurgist for Caterpillar Tractor Co. "AISI 8622 steel, which we had been using, couldn't give us the hard case and strong, tough core we needed in these heavy sections. Other standard carburizing steels with the requisite properties would have cost substantially more. We found, however, that we could achieve the desired surface and core properties by simply modifying AISI 8622 with a higher percentage of molybdenum. We have been using this composition for several years, and results have been excellent."

Caterpillar Tractor Co.'s experience shows how increasing molybdenum in a carburizing steel helped to solve a specific problem. Perhaps your product, too, can benefit by higher molybdenum content.

A technical article, "New Carburizing Steels for Critical Gearing", describes some recent investigations of higher-moly carburizing steels. For a reprint, write Climax Molybdenum Company, Dept. 3, 500 Fifth Avenue, New York 36, N. Y.

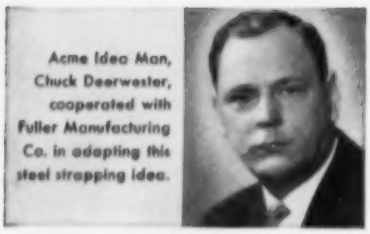
CLIMAX MOLYBDENUM

Check your AIM*. . . Fuller Manufacturing Company did . . .

Strapping transmissions saves money, speeds handling

ACME STEEL STRAPPING helped Fuller Manufacturing Company, Kalamazoo, Michigan, eliminate costly crating and slow manual handling. Now, two transmissions are steel strapped to a wooden skid, with protective top frame. This is accomplished in half the time previously required for the crating operation by the same crew. (Idea No. U6-6)

The steel strapped skid loads are moved by lift-truck, can be stacked six high. Appreciable saving in material cost and storage space are realized. And, damage in transit is reduced.



Acme Idea Man, Chuck Deerwester, cooperated with Fuller Manufacturing Co. in adapting this steel strapping idea.

***Check your Acme Idea Man.** He will show you examples of Ideas-In-Action which are being used to solve all types of packing and shipping problems. Write Dept. SDU-106, Acme Steel Products Division, Acme Steel Company, 2840 Archer Avenue, Chicago 8, Illinois. In Canada, Acme Steel Company of Canada, Ltd., 743 Warden Avenue, Toronto 13, Ontario.

ACME STEEL STEEL STRAPPING

Matched plating processes improve chromium finishing

◆ Outstanding chromium finish obtained by plants using three unique Unichrome processes

◆ Platers also benefit by undivided responsibility for trouble-free copper-nickel-chromium operations

Three integrated Unichrome plating processes have proved they not only save time and money *individually* . . . but even more so working *together*.

The Unichrome Copper deposit is so smooth, it reduces copper buffing time or helps eliminate it entirely. Containing no cyanides, the plating solution cuts costs of waste-disposal also. A receptive base for subsequent nickel plate, Unichrome Copper avoids the trouble arising when a plate goes "passive"

IMPROVED NICKEL

Deposits from Unichrome Bright Nickel, in turn, prove unusually receptive to chromium plate. They resist cracking, add excellent corrosion protection to the base metal. Production-wise, the cost-reducing plating solution displays remarkable stability and reduces amount of additions to the bath, and also control-problems.

MORE EFFICIENT CHROMIUM

With self-regulated Unichrome SRHS® Chromium, plating time is often cut more than half, production capacity of equipment goes up, intricate parts can be successfully plated, and users report finishes with better "color".

These are just some of the many Unichrome processes and materials which offer you opportunities to cut finishing costs . . . to turn out a better product through a better finish. We would welcome the chance to work with you.

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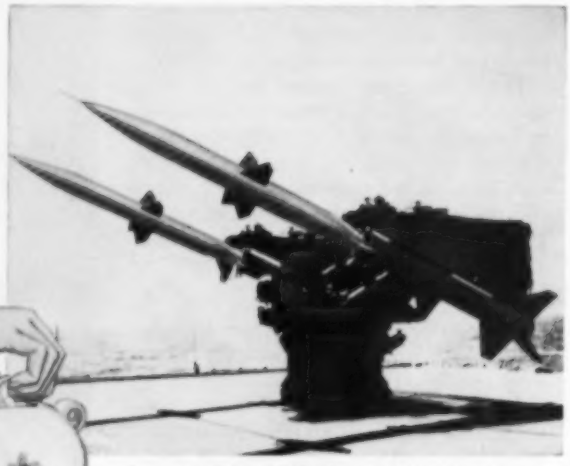

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The taxpaying public usually pictures Uncle Sam as being a loose man with a dollar, busily throwing our cash away with both hands. American industry, serving the defense program, will tell you nothing can be farther from the truth. On the contrary, the Government is running for top honors for sharp-pencil buying.

Typical of the Government's conservation program is the wide acceptance of rolled and flash welded rings as the most economical way to produce circular weldments for jet aircraft engines, guided missile parts and many other products of our military defense program.

"Value Analysis" is fast becoming a part of American industry's buying procedure. For further information on ring applications write to:

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THE AMERICAN WELDING & MFG. CO.
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STEEL

October 22, 1956

Metalworking Outlook

Iron Ore Imports Soar

Some 37 per cent of the iron ores used by American furnaces will be imported by 1975. The breakdown: 21 per cent from Canada, 11 per cent from Venezuela and 5 per cent from other sources. By 1960, ore imports will reach 26 per cent of our total, or 45 million gross tons, compared with the 129 million tons supplied by domestic sources. Last year, we imported 23 million tons (15 per cent of our total supply) and mined 129 million tons within U.S. limits.

Scrap Stocks Slip

Consumers are entering the winter of 1956-57 with stocks of scrap about 5 per cent lower than they were a year ago, says Edwin C. Barringer, executive vice president of the Institute of Scrap Iron & Steel. Exports of scrap are running slightly under those in 1955 for the same period.

Pittsburg Steel Plant?

Nothing has developed in the last six months to indicate the possibility is any closer that U.S. Steel Corp. will build an integrated steel plant in Pittsburg, Calif. Months ago, U.S. Steel's Columbia-Geneva Steel Division completed purchases of about 600 acres of tidelands around its present Pittsburg mill. The transactions were "defensive"—land in that area was being grabbed up, so the corporation took precautionary measures. Market and production studies have been undertaken to prepare for a day when an expansion on the scale of an integrated mill in that territory would be economically feasible, but there have been no appropriations for such a move.

Hawaiian Steel Plant?

Watch for the formation of a small steel industry in Hawaii. The plan is part of the island's program to broaden its industrial base. If set up, the mill would use island scrap and some pig iron to produce structural steel shapes.

Labor Goes Scientific

Unions are going scientific in their organizational drives. Some organizations are employing attitude-research groups. The union picks a plant it contemplates organizing. Instead of flooding it with leaflets immediately, it goes to the survey agency. The agency sends a staffman to look over the general situation by talking to key union and other people, and studying the plant's history. He conducts a few pilot interviews with plant workers to orient himself and to decide on the key questions field interviewers will use. Fieldmen call on 1 to 2 per cent of total employment. Interviews may last 2 to 4 hours as the questioners probe for feelings

Technical Outlook—p. 77 Market Outlook—p. 117

about the company and receptivity to unionism. From all that, the agency and union decide if the union drive is feasible and, if so, how to go about the organizational strategy.

About Face on Titanium

Some planemakers are backing off from earlier predictions that titanium would replace stainless steel and aluminum in new jet aircraft. Because the material is still expensive, not more than 1 per cent titanium is being used in the five aircraft now under production at Douglas Aircraft Co.'s El Segundo, Calif., plant. Many aircraft engineers believe that when titanium becomes easier to handle and less expensive, it will find its most significant application in commercial, not military aircraft.

Aid on Columbium-Tantalum

Look for a spurt in columbium-tantalum developments (see page 48). The U.S. will give subsidies to miners or processors of domestically produced columbium-tantalum bearing ores and concentrates. The General Services Administration has authority to purchase a maximum of 250,000 lb of the material between now and Dec. 31, 1958; that's far more than the domestic industry has ever produced in any two-year period. GSA will pay $1.40 to $3 per pound, plus a bonus equal to the purchase price to whoever mined the ore.

Memo on Nickel

Washington is considering a proposal from a private firm which requests a U.S. loan to help open a new source of nickel. If the government accepts, the move would be a departure from the current policy of encouraging nickel production, which is to guarantee that the U.S. will buy a certain part of the output at premium prices.

Why Ford Hired Nance

Why did Ford Motor Co. hire James J. Nance who was forced to bow out as president of Studebaker-Packard Corp.? Here are three possible explanations: 1. Mr. Nance is 55, while three of Ford's top men—Ernest R. Breech, Lewis D. Crusoe and D. S. Harder are or soon will be 60 or older; the next oldest top man is 48, so Mr. Nance fills a gap in the age brackets. 2. For some months, Ford had been without a vice president for sales; Mr. Nance as vice president for marketing will take over long-range sales planning. 3. Ford doesn't think Mr. Nance failed personally at S-P; his financing failed him.

Straws in the Wind

General Motors Corp.'s Electro-Motive Division will advance diesel locomotive prices 4.5 to 5 per cent after Dec. 1 . . . Automobile production in west coast plants is expected to accelerate as much as 25 per cent . . . Radioisotopes are reducing industrial production costs by an estimated $150 million annually . . . Industrial production in September climbed to 144 per cent of the 1947-1949 average, equal to the record level reached in December, 1955.

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Aluminum is undisputed leader over copper for high-voltage overhead power transmission purposes. Its light weight and high current carrying capacity offer unparalleled engineering and economic advantages.

But to carry the load of its own weight over long spans . . . and to resist more effectively the forces of extreme temperature changes, winds, lightning and ice—aluminum cable needs the support of a strong steel core. That's where DSC ACSR(1) Core Wire comes in.

WHAT ACSR CORE WIRE IS: We produce it at our Portsmouth Division . . . from the blast furnace up . . . as a hard drawn, high carbon (0.50 to 0.75%), high tensile (190,000 psi min.), heavily zinc-coated Specialty Wire.

Here job-performance begins with strict conformity to ACSR(2) specifications (ASTM B-245-55 and B-261-55). Little leeway is permitted in chemical composition, physical properties, dimensional accuracy, weight of coating, perfection of finish. Quality consistency is a must—for efficient stranding by the cable fabricator.

THE RECORD: Our Portsmouth ACSR Core Wire customers are among the top aluminum cable manufacturers. We ship them millions of pounds of this product in a year's time. Here's the record:

For the first eight months of 1956—January 1 through August 31—out of every 100,000 pounds shipped, 99,592 pounds on the average met all customer acceptance tests.

JOB-PERFORMANCE SCORE—99.59%

For 1955 (full year) the job-performance score of DSC ACSR Core Wire averaged 99.47%.

(1) *Aluminum Cable Strand Reinforcement*
(2) *Aluminum Conductors, Steel Reinforced*

Courtesy Reynolds Metals Company, Louisville, Ky.

Whether you use Rod and Wire Products, or Sheet or Strip—you'll find DSC *steelmanship* the same.

How about calling in a DSC Customer "Rep" to talk over your own requirements . . .

this very day?

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DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

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Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

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Honesty in Politics

Whether you are the boss in the front office or have a job in the shop, you are interested in honesty in politics. Let us see what is happening in the political campaigns.

President Eisenhower is portrayed by the Democratic candidates as a part-time president, a sort of chairman of the board, unaware of the great problems of the age at home and abroad.

On the issue of peace, the Democrats charge that the administration has lost face for us around the world and told us fairy tales instead of grim realities.

The draft is regarded as a wasteful, inefficient and often unfair way to maintain the strength of the armed forces. Its early end by the Democrats is implied but not promised.

Testing of the H-bomb must stop, say the Democrats. Radioactive fall-out, they claim, will do immeasurable damage to the human race.

The Democrats say that in our two-party system it is the historic task of the Republican party to represent wealth, power and bigness.

President Eisenhower stands on his record and responds to his opponents only when they impugn or falsify that record.

Ever since Korea, he has waged the struggle for peace. Military manpower needs have been reduced through technological developments. No nation has found a substitute for the draft.

The National Academy of Sciences says H-bomb tests could be continued for another 30 years without even approaching our average exposure to medical x-rays.

On the issue of big business, the President cites record high employment and income and asks: Would you rather have some failure that never did anything or a successful businessman in charge of the Defense department?

From 1939 to 1952 the buying power of the dollar was cut in half. Since 1952, its value has been protected, the national budget balanced.

We need honesty in politics as well as in government. In the words of the President, you will decide by your vote on Nov. 6 how you will work, live and prosper in the next four years.

Irwin H. Such
EDITOR-IN-CHIEF

How can FLO-FORM* parts save you money? Simple! By forming the part, hot or cold, out of bar or wire with practically no waste of costly metal.

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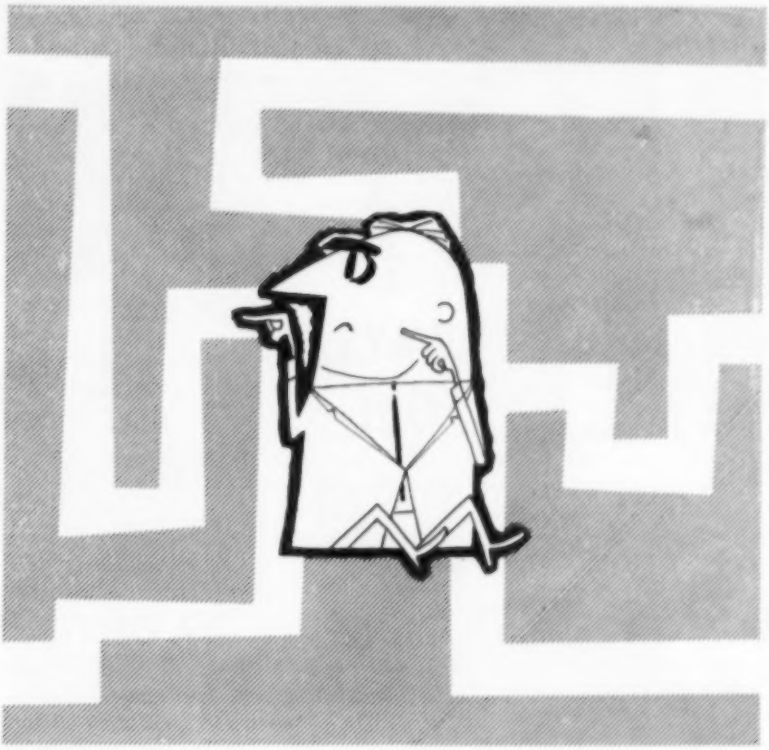

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Wage Differential Maze: Where's Escape?

A YOUNGSTOWN fabricator finds that the wage rates it pays in its stamping operations are 20 cents an hour above the average in other northeastern Ohio pressed metal shops.

A TUBING manufacturer had to settle with the United Auto Workers for the Ford-GM pattern. Several of his major competitors, not organized by the UAW, enjoy "substantially lower" wage costs.

A MATERIALS handling equipment maker in a small Indiana city recently suffered an eight-week strike. The issue: The union wanted wages comparable to those of a neighboring company even though the firm was not in the same field and was paying higher-than-average rates for the community.

Companies which find themselves on the high end of wage differences between themselves and competitors are growing more restive. More are willing to take a strike to try to avoid such differentials.

Why?—Painful wage differences arise usually because of one of three circumstances:

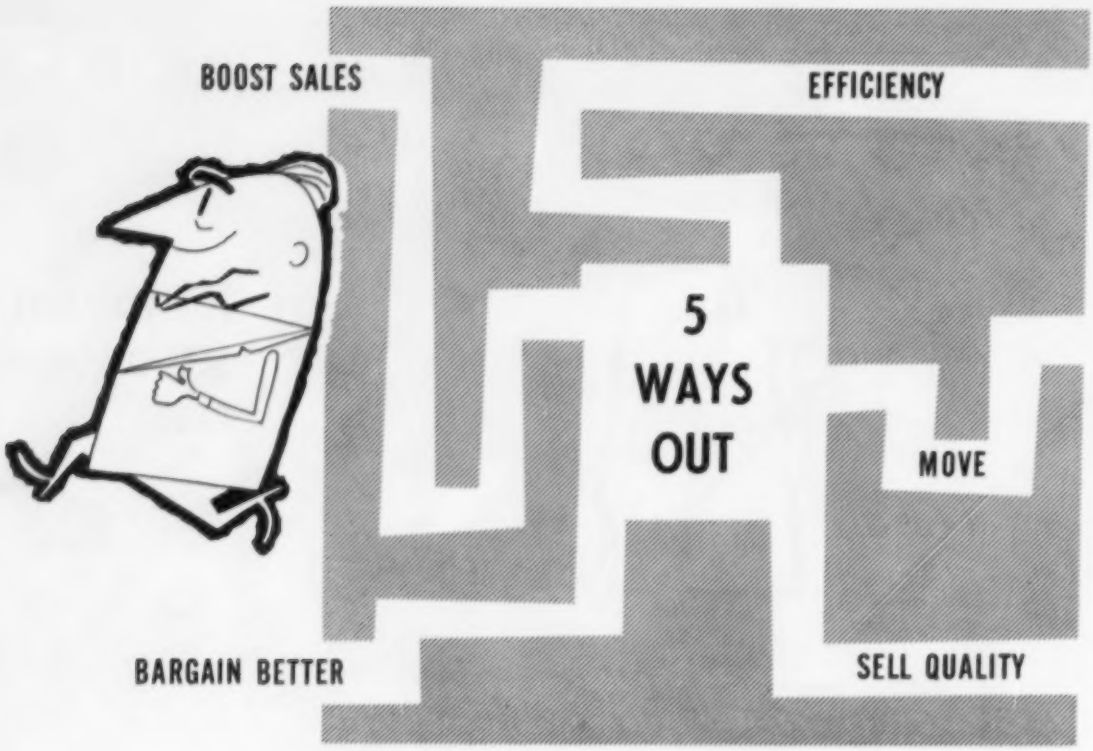
1. The company is in a town dominated by one industry, such as Youngstown, where basic steel predominates and where the United Steelworkers can impose the basic steel settlement even on aluminum fabricators and others which aren't in basic steel.

2. The company, often small, is in an industry organized by an unusually powerful union, such as the UAW, which uses the competitive factors in the field to its negotiating ends.

3. The company is the victim of a "me too" situation where a neighbor has higher rates, or another plant in a diversified multiplant operation pays more; the neighbor's or other plant's scale usually is competitive in its own product line but far above the victim's rate.

What happens when a company is on the wrong side of wage differentials? An electrical equipment builder whose wage costs average 23 cents an hour above those of his major competitor has

So sensitive is this problem that nearly all of the more than 50 companies interviewed refused to talk unless STEEL promised anonymity. STEEL normally insists on using names to document articles but this time waives the requirement because of the fear of union reprisal on the companies involved.



cases where he's underbid 30 to 40 per cent by companies with lower scales. A metal furniture manufacturer, who pays 30 to 80 cents per hour more than most of the other firms in his field, says: "Our profit per dollar has been steadily dropping. The only way we've been able to keep going is to boost volume."

Move Out—When faced with the wage differential situation, some companies move out or liquidate. Two Cleveland bicycle operations have been moved to the South. An aluminum extrusion maker hasn't moved out of a southern Illinois city, but it's not expanding its extrusion business there; it has chosen a coal town that wants more diversified industry as the site for added facilities. Another firm has a 1000-job plant for the production of aluminum extrusions in mind. It considered Youngstown but finally picked Memphis, Tenn., as the spot for the new plant because of the labor factor.

A lawyer specializing in labor negotiations says this about the wage differential problem: "It usually hits the smaller companies the hardest. Unions, which claim to be alarmed about the plight of small business, are themselves contributing to the distress."

What To Do?—As the accompanying exhibits suggest, five principal courses are open if you are threatened with demands that will put your costs above your competitors':

1. **Move out or expand elsewhere.** Many do it, but are they assured of long-term safety? District 50 of the United Mine Workers is even spending money trying to get new industries into depressed coal areas, but the UMW is scarcely noted for its genial position on wage rates over the long pull.

Nor is a move to the South to escape unionization a sure thing. The AFL-CIO states that one of its policies will be a renewed organizational drive in Dixie.

2. **Give in, but offset the higher costs, at least partly, with improved efficiency.** It's the most common approach. The Youngstown fabricator will spend $500,000 for new equipment this year and has committed at least $250,000 annually ever since the end of World War II.

But there's a limit to what can be done with improved efficiency. If competitors are good (and most of them are), they'll be coming up with just as many new ideas for efficiency as you do.

3. **Sell on quality and service, not price.** Here's another good approach. A gray iron foundry reports: "One of my competitors pays some 30 cents an hour less than I do for labor. He's not getting the quality I receive. His work force is less experienced. He underbids me frequently, but my quality often gets the job."

Yet, higher quality doesn't always result from higher wages. More service also costs more money. There are limits to this approach.

4. **Boost sales volume.** The metal furniture maker did. It usually goes along with improved quality and service. This has been the salvation of many suppliers of auto parts.

Obvious limitations exist here, too. A company that makes 0.1 cent per sales dollar after taxes can't last long at that rate.

5. **Do a better job of bargain-**

ing. It's probably the most effective of the five approaches, but also the most difficult. Companies caught in the Youngstown squeeze find it almost impossible to get anywhere with the union. Small companies, particularly, are almost helpless in the face of pattern bargaining by a giant like the UAW. Companies with many plants are hard pressed for a logical answer to this union question: "You're paying $3 in Chicago, why only $2.20 in Podunk?"

But it can be done. Seven small job shops (making castings, stampings, screw products and aluminum extrusions in a small city with a labor situation similar to Youngstown's) bargained jointly with the union. They presented their competitive facts to both the union negotiators and the members and won a package smaller than that granted by the dominant company of the area.

Despite the United Steelworkers' policy in Youngstown, indications are that the USW is changing its thinking. A University of Chicago study shows that in USW-fabricator contracts the number of settlements with deviations from the basic steel contract has increased each year since 1942.

That trend should eventually help in the Youngstown situation and in the one caused by the powerful union in a highly competitive industry. American Motors Corp. has proved that you don't have to accept pattern bargaining, even from the UAW. "About a year ago," recalls Edward L. Cushman, vice president for industrial relations at AMC, "representatives of the UAW local at our Milwaukee body works agreed to terms other than those won at Ford and GM. The workers refused to ratify the settlement because it didn't fit the pattern. We told the representatives that they had failed to sell the proposal. So, we would go to the workers and sell it. The representatives hastily got the O.K. Going to the workers, or even the threat of it, does wonders."

General Electric Co. believes in "going to the workers" the year around with the facts about the company and the labor situation. Virgil B. Day, GE's manager of union relations, believes that policy is the key to the company's success in the labor field. GE's objective, he says, is always to identify employee interest with company interest. "Good communications is the only way to do it—through management letters and talks to workers, education of foremen on wage and other labor problems." GE believes the policy helps keep wages in each plant comparable to those prevailing in each community where it has operations.

AMC, which deals with some 17 different unions, heard this familiar argument from the United Electrical Workers in its Peoria, Ill., plant not too long ago: "We want a package comparable to what you give in Michigan and Wisconsin." Comments Mr. Cushman: "We didn't grant it because that would have put them out of line with Peoria levels and with the appliance industry generally. Again, we gave the union and its members the facts. As long as a union is convinced that you're not out to undermine it, you can usually do wonders with an honest presentation of your case."

Conclusion — Labor experts agree that the problem of wage differentials grows more serious. "Bargaining today is tougher and more scientific than at any time in my experience," says one veteran management negotiator who supervises or advises in some 200 negotiations annually. "Union men have more facts at their disposal, more training behind them. Increasingly, they're using the 'differential' argument—that you are 10 cents below the industry average or the community average or even the plant across the street. Unions can practically always find somebody paying more than you, so that becomes the bogey."

Even an occasional union official is becoming alarmed at the situation. Listen to this district executive: "The boys at headquarters should take a close look at this problem. We've driven out or killed off several companies because of it."

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*

Check Reserve Status

State director warns action under new Reserve Act may leave firms short-handed

IT'S POSSIBLE that a company could have a whole department called up for reserve training in the near future, warns Col. Arthur Holmes, Michigan's selective service director.

To avoid this possibility, Colonel Holmes has told members of the Detroit chapter of the American Society of Tool Engineers that company personnel records should contain a brief military history and the reserve status of each employee.

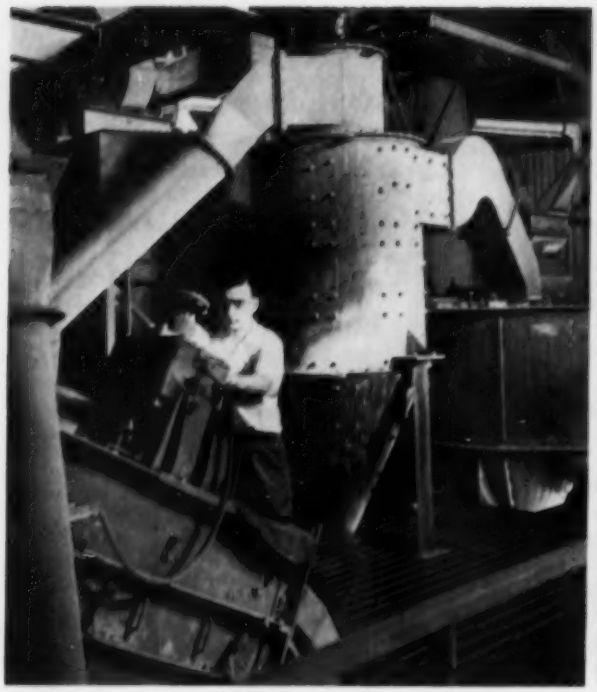
Under the reserve act of 1955, draftees returning from active duty are required to serve in the Ready (active) Reserve. "The national goal is to have 3 million men in the Ready Reserve not later than 1961. Any reduction in the standing forces will require a greater increase in reserve strength," explains the selective service colonel.

In most cases, companies legally are required to give these men back their jobs, also grant them time off for training. This means shift reassignments for weekly drills, summer training leaves and possible pay adjustments. Colonel Holmes thinks that firms which don't know the reserve status of employees may be caught short when these problems finally have to be faced.

He also points out that employees with critical skills have a good chance of being transferred from the Ready to the Stand-by Reserve where they don't take training. This classification is composed of three groups: R-1 (ready immediately); R-2 (occupational deferment); R-3 (family deferment). Men with critical skills should be in R-2, says Colonel Holmes.

"The responsibility for making these requests lies with the employer. Selective service boards aren't mind readers," says the colonel.

That's why companies should know how their men stand in the reserve.



This multistage screen helps classify particles by size

Rotary kiln drying equipment treats ores before milling

Cashing in on Rare Metals

Companies like Shieldalloy have developed multimillion dollar businesses in columbium, tantalum, other metals through new advancements in metallurgy

"COLUMBIUM, tantalum and their alloys are helping to brighten our sales forecasts," says Stanley W. Madsen, sales vice president, Shieldalloy Corp., Newfield, N. J.

The company was formed five years ago to meet the growing demand for processed minerals, powdered and vacuum melted metal and its alloys from the welding, specialty steel and foundry industries in this country. It also is an exclusive agent for H. C. Starck, a German producer of metallic columbium and tantalum.

Shieldalloy is a subsidiary of Metallurg Inc., a world-wide mining and ferroalloy organization. It has combined its research efforts on columbium and tantalum with Elchem, a research institute in Nurnberg, Germany.

Some Potentials—Various mixtures of columbium and tantalum are finding expanding uses in carbide cutting tools, atomic energy and high temperature alloy applications. Metallic tantalum has gained wide acceptance for use in electronic capacitors and is receiving increased recognition by the chemical industry for use in components which must resist highly corrosive atmospheres.

In carbide tool applications, the use of columbium and tantalum carbide powders reduces the tendency of the chips to weld to the tool and cause crumbling of the edge.

It's Expensive—Tantalum is $50 to $60 a pound; columbium, $80 to $120 a pound. Tantalum melts at 5486°F; columbium, 4352°F.

Ingot—Powder metallurgy techniques are used to produce columbium and tantalum metallic ingots. The powder is cold compacted and vacuum sintered. It is then ready for the fabricating mill. There is a possibility that a vacuum arc melting process may be able to produce ingots of higher density and purity than is now possible in the not too distant future.

Ferrocolumbium and ferrotantalum are being produced by Shieldalloy and are used in iron and nickel base alloys. By producing a vacuum melting grade of chromium, master alloys of columbium-tantalum-chromium are being developed.

Shieldalloy is working on chromium-molybdenum and chromium-tungsten alloys, too. Master alloys are sold to special ferrous and nonferrous alloy makers for ingot production.

1957? — Sales of Shieldalloy's products will top $4 million this year, reports Mr. Madsen. He adds: "If our markets continue to develop as fast as they have in the last five years and interest in columbium and tantalum keeps on multiplying, our dollar sales could double in 1957."

Canadian Expansion

Dominion Bridge will increase capacity 40 per cent with a $20-million four-year program

A FOUR YEAR coast-to-coast expansion program will affect every one of Dominion Bridge Co. Ltd.'s nine plants and its six wholly owned subsidiaries.

Expenditures of $20 million will be divided almost equally among the company's four regional divisions — eastern, Ontario, western and Pacific.

In the East—A larger office will be built at the Lachine, Que., plant now under construction. A steel warehouse and enlargement of the structural steel fabrication shop are planned for Longue Pointe, Que.

At Robb Engineering Works Ltd., a subsidiary at Amherst, N. S., additions will be made to the plate and boiler shop and facilities for structural steel fabrication. Handling will be improved.

The company's plant in Ottawa will be abandoned eventually. Replacing it will be a new plant with twice its capacity.

In Ontario—A steel fabrication plant will be erected at the Mt. Dennis plant, Toronto, Ont. This addition will improve warehousing and light manufacturing facilities at the company's Shaw street plant.

Western, Pacific—A large structural fabrication shop will be built in the Edmonton, Alta., area, and the plant will be enlarged. Increased capacity is also scheduled for the Calgary, Alta., works.

The program will follow on the heels of an expansion at the company's two Vancouver, B. C., plants. More space for structural steel fabrication, enlargement of a recently completed plate shop, improvements in handling facilities and a new office building will be provided for the Burnaby plant. The size of the steel warehouse at False Creek will be doubled.

Trane Builds Two Plants

The 1956-57 expansion program of Trane Co., La Crosse, Wis., totals $13 million. Plans include the building of two manufacturing plants and the doubling of research and testing facilities.

A 68,000-sq-ft plant which will produce brazed aluminum heat transfer units is scheduled for completion by the middle of 1957. A building for the manufacture of low horsepower air conditioning compressors will contain about 60,000 sq ft.

Eaton Division Grows

The Dynamatic Division of Eaton Mfg. Co., Kenosha, Wis., will be enlarged by 35 per cent. Machine tools will be added and manufacturing, storage, laboratory and office areas expanded. Cost will be about $2.5 million.

A $1¼-million expansion program for new construction, machine tools and equipment has just been completed.

Atom Plant O.K.'d

The Illinois Commerce Commission has authorized Commonwealth Edison Co. to start construction of a $45-million nuclear power plant.

It will be built by General Electric Co. about 50 miles southwest of Chicago. Ground breaking is scheduled for spring, completion by mid-1960.

Aluminum for Ships

Newport News Shipbuilding & Drydock Co. lowers a section of a 114-ton elevator into position aboard the *USS Ranger*. The all-aluminum unit, estimates Aluminum Co. of America, weighs 34 tons less than a similar elevator made of high tensile steel

Plan Uranium Refining

Mallinkrodt Chemical Works, St. Louis, and Climax Molybdenum Co., New York, formed a company which will build a $22-million plant at Henderson, Ky., to refine uranium ore and concentrates.

The joint enterprise (Climax is the majority owner) made one of seven proposals the Atomic Energy Commission received to do such work.

More Hydrogen Production

National Cylinder Gas Co., Chicago, is expanding its electrolytic hydrogen producing plant in Los Angeles by 70 per cent. Plans provide for further increases in capacity.

A new hydrogen plant will be built in St. Paul, says National Cylinder's president, Charles J. Haines. Production is scheduled to begin early next year.

Lincoln Starts Expansion

Contracts for a $5.5-million building addition (part of an $8-million expansion program announced earlier this year) to Lincoln Electric Co.'s 20-acre plant have been awarded to the Austin Co. Both are Cleveland firms.

The 456,000-sq-ft addition will be ready in the fall of 1957.

Dravo Builds Barges

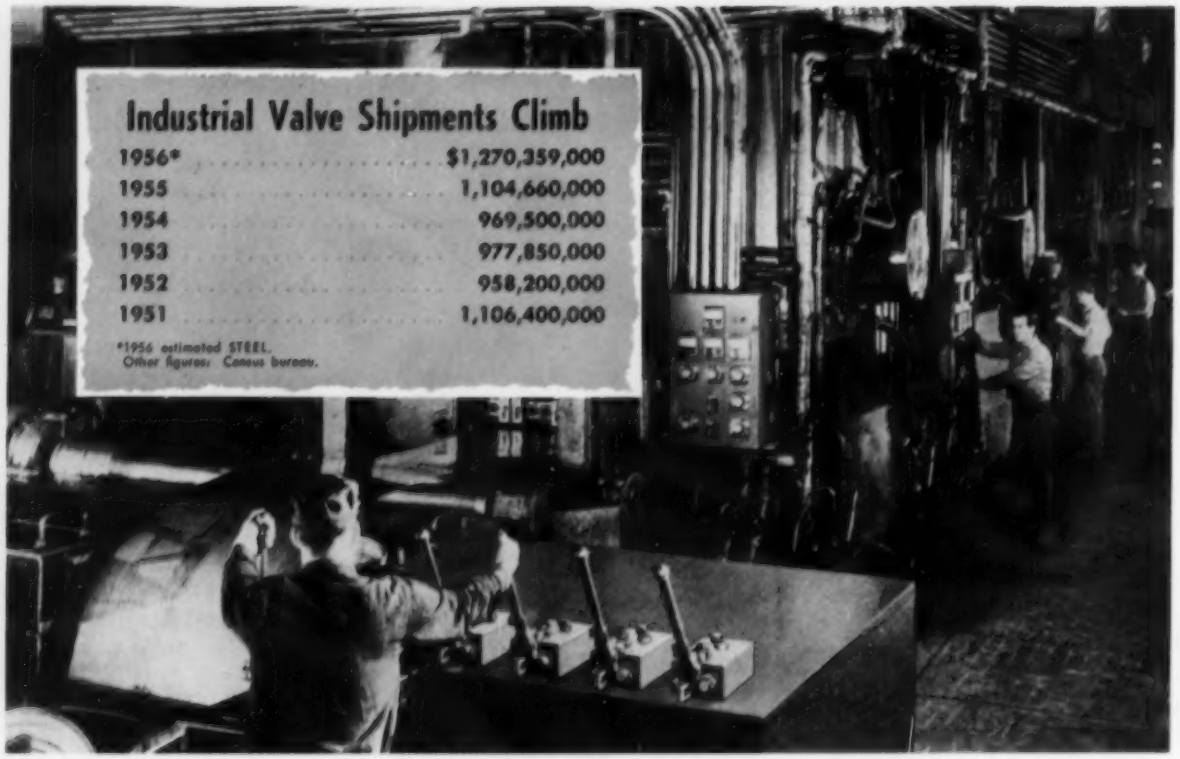
Five welded steel barges for use in the New York harbor area will be built by Dravo Corp., Pittsburgh, for the Tracy Steamships Corp., Wilmington, Del.

The deep-draft barges will be built at Dravo's Wilmington shipyards. Delivery is scheduled for next summer. Each barge holds about 2500 tons of coal.

Welding Alloys Grows

All-State Welding Alloys Co. Inc., White Plains, N. Y., has completed its fifth expansion: Facilities for making alloys and fluxes for welding shops have been increased by one-third.

More construction is in the planning stage. It will at least double production of extruded alloys for welding aluminum and increase production of flux-coated bronze.



Steelmaking machinery is big valve market for C. B. Hunt & Son Inc.

Valves Vault Billion Barrier

After flirting with the magic $1 billion mark since 1951, shipments of industrial valves and fittings will leave it far behind this year. Outlook for 1957 is better yet

A GROWTH of 78 per cent in six years is good going by any standards. A growth of over 308 per cent is phenomenal.

Both feats were accomplished by the valve industry between 1947 and 1953. Over-all, industry shipments rose from $548 million to $977 million. Shipments of control valves jumped from $32.5 million to $132.7 million.

Outlook—It's to be expected that the valve industry as a whole will continue to flourish. This year, it is running at a fast $1.27-billion clip (see table). And the outlook is good for next year. Power plants, petroleum refining, construction and shipbuilding will be increasing their demands.

It's an even better bet that the control valve sector of the industry will continue to gain stature. Industrial pneumatic and hydraulic control valvemakers, like Logansport Machine Co., Logansport, Ind., are feeling the benefits of the increasing demands upon machinery builders for speed and accuracy.

Definition — While standard valves are used to control flow of a fluid, they are used only to help get that fluid from one place to another.

Control valves also govern fluid flow. But the fluid is not a raw material. It's used as a means of transmitting power. You close a valve, a piston is energized, a machine tool starts a new cycle.

Big markets for standard valves are utilities, petroleum refineries, chemical and gas transmission facilities. Big markets for control valves include machinery — anything from a machine tool to a lift truck or a rolling mill—aircraft and guided missiles.

Quotes—Says Logansport: "Automation is playing a big part. More transfer systems and conveyors mean more positioners, clamps and ejectors." This year, Logansport's business is running about 30 per cent ahead of 1955's.

Adds Hannifin Corp., Des Plaines, Ill.: "Business follows capital spending trends. Our sales gains will come in proportion to those enjoyed by machine tool, road and automation machinery builders."

Who's Who—Aircraft and missile valve needs are filled by perhaps 200 builders. Most are near the centers of defense activity on the West Coast. This segment of the control valve business is usually regarded as separate from the industrial control valve market, mostly because of geography.

The Census Bureau says that there are slightly over 700 producers making valves of all types. It's a safe bet that at least 200 specialize in industrial machinery control valves, the remainder in the standard fluid flow valve.

Fast Tax Score Card

BETWEEN July 13 and Oct. 12, steel producers filed applications for $1.5 billion worth of fast tax write-offs with the Office of Defense Mobilization.

Latest word is that no decision will be made on allowing part or all of the applications before early 1957.

U.S. Steel Corp., Pittsburgh, filed the largest petition. Its applications add up to $459 million. Armco Steel Corp., Middletown, O., is second at $301 million. Other companies with applications for over $100 million are Jones & Laughlin Steel Corp., Pittsburgh; Inland Steel Co., Chicago; and McLouth Steel Corp., Detroit.

Four Big Months in Steel Companies' Expansion Planning

Date	Company	Area	Type Facility	Estimated Cost
7/13/56	Jones & Laughlin	Houston area	Steel tubing mill	$250,000,000
8/13/56	U.S. Steel (3 apps.)	Lorain, O.	Steel tubing	74,858,000
8/13/56	U.S. Steel (3 apps.)	McKeesport, Pa.	Steel tubing	81,304,000
8/27/56	U.S. Steel	Chicago	Steel shapes	5,000,000
8/27/56	U.S. Steel	Chicago	Steel plate	17,895,000
8/27/56	U.S. Steel	Chicago	Mill	33,136,000
8/27/56	U.S. Steel	Chicago	Mill addition	8,895,000
8/27/56	Alan Wood Steel	Conshohocken, Pa.	Pig iron, ingots	3,539,000
8/27/56	Alan Wood Steel	Conshohocken, Pa.	Powdered iron plant	3,500,000
8/27/56	U.S. Steel	Gary, Ind.	Mill addition	62,215,000
8/27/56	U.S. Steel	Gary, Ind.	Mill addition	46,483,000
8/27/56	U.S. Steel	Gary, Ind.	Coke ovens	35,000,000
8/27/56	Youngstown Sheet & Tube	Campbell, O.	Pipe & tubing	24,375,000
8/27/56	Inland Steel	E. Chicago, Ind.	Steel products	4,180,000
8/27/56	Inland Steel	E. Chicago, Ind.	Strip steel	16,264,000
8/27/56	Inland Steel	E. Chicago, Ind.	Steel ingots	18,430,000
8/27/56	Inland Steel	E. Chicago, Ind.	Pig iron	2,020,000
8/28/56	U.S. Steel	Morrisville, Pa.	Steel ingots	48,900,000
8/28/56	U.S. Steel	Morrisville, Pa.	Blast furnace	13,000,000
8/28/56	U.S. Steel	Morrisville, Pa.	Ore sintering	8,500,000
8/28/56	U.S. Steel	Morrisville, Pa.	Coke ovens	19,000,000
8/28/56	U.S. Steel	Morrisville, Pa.	Mill addition	5,000,000
9/7/56	Kaiser Steel	Fontana, Calif.	Coke oven	20,000,000
9/7/56	Kaiser Steel	Fontana, Calif.	Blast furnaces	12,000,000
9/7/56	Kaiser Steel	Fontana, Calif.	Ingots	7,000,000
9/7/56	Kaiser Steel	Fontana, Calif.	Wide flange beams	15,000,000
9/7/56	Kaiser Steel	Fontana, Calif.	Utilities	1,000,000
9/7/56	Kaiser Steel	Eagle Mt., Calif.	Sinter plant	4,500,000
9/7/56	Kaiser Steel	Eagle Mt., Calif.	Iron ore facilities	3,000,000
9/7/56	Kaiser Steel	Eagle Mt., Calif.	Coal mine	2,500,000
9/10/56	Detroit Steel	Portsmouth, O.	Open hearth	16,445,000
9/13/56	Crucible Steel	Midland, Pa.	Coke oven, rolling mill	62,818,000
9/13/56	Lukens Steel	Coatesville, Pa.	Steel plate	40,000,000
9/13/56	Inland Steel	Indiana Harbor, Ind.	Rolling mill	100,225,000
9/13/56	Allegheny Ludlum (six apps.)	Various	Rolling mills	7,661,000
9/18/56	Armco Steel	Ashland, Ky.	Pig, ingot, finishing	136,396,000
9/20/56	McLouth Steel	Detroit	Pig iron, ingot	100,250,000
9/24/56	Republic Steel	Cleveland	Sheet mill	4,500,000
9/24/56	Inland Steel	Indiana Harbor, Ind.	Utilities	7,000,000
9/26/56	Youngstown Sheet & Tube	Youngstown	Seamless tubing	1,579,000
9/26/56	Youngstown Sheet & Tube	E. Chicago, Ind.	Seamless tubing	3,585,000
9/26/56	Youngstown Sheet & Tube	E. Chicago, Ind.	Steel sheets	6,928,000
10/1/56	Armco Steel	Houston	Pig iron, steel ingots, finishing facilities	118,000,000
10/4/56	Armco Steel	McAlester, Okla.	Facilities to produce metallurgical coal	5,000,000
10/4/56	Republic Steel	S. Chicago, Ill.	Seamless steel pipe	2,149,000
10/8/56	Armco Steel*	Middletown, O.	Sheet, strip (addition)	42,298,000
10/11/56	Granite City Steel	Granite City, Ill.	Blast furnace, addition to strip mill	23,075,000

*This is a refiling of an application rejected in July, 1955. The facility is already under construction and raises the question of retroactive tax amortization if a new steel expansion goal is opened. The company could request certification on the basis of the original July, 1955, filing.

Why Do Small Businesses Miss Government Orders?

ALTHOUGH professional champions of small business are having a field day in this election campaign, its chances of getting more government business look slim—no matter who wins the election. Take a recent proposal to set aside 25 per cent of government orders for qualified small companies. Those close to the problem say such a setup would be impossible to administer, and would probably result only in higher cost of government. Besides, many projects which make up a large part of government spending (aircraft and missiles) just can't be handled by small business. One source estimates small business could theoretically handle 30 per cent of government orders under these circumstances: 1. If all small firms wanted the business (many don't; they're doing too well in civilian business). 2. If small business were favored by a price differential (Congress itself directs that contracts go to low bidders; on equal bids, small business does get preference). 3. If small firms could meet quantity and time schedules (many don't). Summing up: While there is room for improvement, small business is doing better on government work than some sources would have you believe.

No Free Rein On Jet Engine Design

The Defense department has ended its quota system on the use of six critical materials in jet engines. The system had the effect of limiting the amounts of cobalt, nickel, chromium, columbium, molybdenum and tungsten used per engine. But the action does not give free rein to designers to specify unlimited amounts of those metals in new engines. The Defense department will continue to keep close tab on how much critical material would be chewed up by a new engine if it were produced in wartime quantities. If amounts are out of line with potential supplies, some adjustment in design will be required. Basically, the Pentagon line still is: "Use as little of those materials as possible." Insistence on that policy in the past has resulted in substantial reductions in critical materials used per engine even while performance has continued to improve.

Delivery Date on Atom Ship To Be Set

President Eisenhower has given his O. K. to the building of a nuclear powered merchant ship. Delivery date of the $40-million vessel depends mostly on how soon a power plant can be put together. Estimate is now 39 months from the time a contract is let, but AEC Chairman Lewis Strauss says efforts are being made to cut that time. The atomic ship will be about 595 ft long, have a beam of 78 ft and a draft of 30 ft. Cargo capacity will be 12,000 tons. While hopes for success are high, it is admitted that the ship won't be competitive costwise.

Tankers in Lieu of Suez?

The government is also looking at the possibility of building 50 large tankers. Planning is aimed at reducing the Free World's dependence on the Suez Canal route for oil shipments from the Middle East. The government would buy any tankers for which private buyers couldn't be found. A 60,000-ton tanker has a price tag of about $18 million; tankers planned under this program could be even bigger.

Nickel Platers in Search

Nickel platers are now wading through Commerce department survey forms aimed at collecting accurate information on how much of the metal the plating industry uses. A report on results is due to Congress by Dec. 31. Information is wanted on the quantity of nickel and nickel salts used, the amount purchased from plating suppliers at market prices and from plating suppliers at premium prices, and "other sources." Nickel platers are required by law to supply the requested information.

Washington Whispers

• Help in solving 35 new technical problems of national defense has been asked for by the Defense department. They range from a way of inspecting joints made by metal-to-metal "glues" to an electronic stethoscope to detect worn machine components like bearings and gears.

• Needs of the private atomic energy industry for scientists and engineers are being studied by the Atomic Industrial Forum under contract to the Atomic Energy Commission. The survey will take about five months. It is the first of a four-part study aimed at pointing up the fact that the rate of advancement of nuclear science depends on the availability of trained manpower.

• GI requests for home loan applications and appraisals in September fell 8.5 per cent and 15 per cent below August figures, though new home starts held steady.

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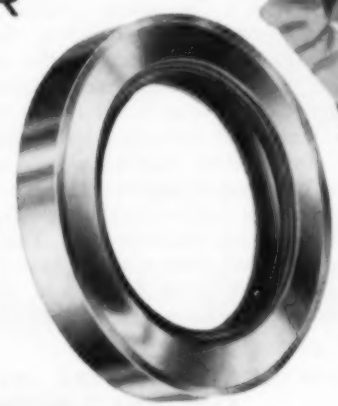

TESTING

Four complete C/R test laboratories are maintained solely to verify seal designs and materials with your specifications, with test runs in special C/R Machines and in customer units.

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Six C/R plants can produce your seal in any quantity . . . six, sixty or 600 thousand . . . with consistently uniform quality . . . and deliver on schedule.

MATERIALS

C/R has a wide selection of sealing materials suitable for temperatures from –100° to 500° F., pressures from 0 to 10,000 p.s.i., and shaft speeds up to 80,000 r.p.m.

EXPERIENCE

Over 75 years of experience — broadest in the fluid sealing field. More automobiles, farm equipment and industrial machines rely on C/R Oil Seals than on any similar sealing device.

CHICAGO RAWHIDE MANUFACTURING CO.

Offices in 55 principal cities. See your telephone book.

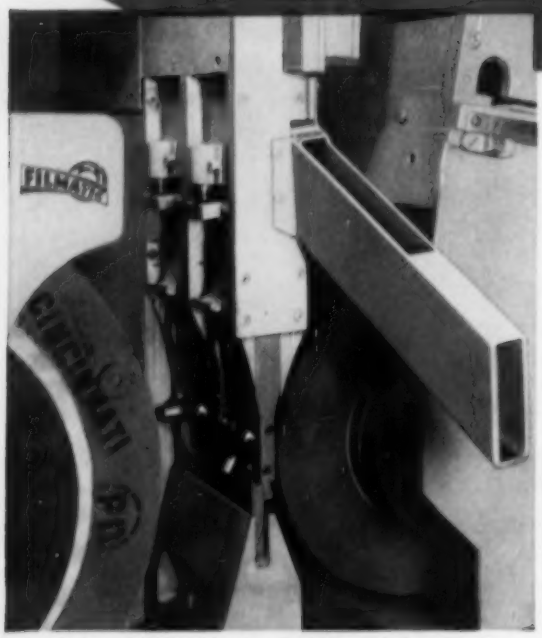
In Canada: Chicago Rawhide Manufacturing Co., Ltd., Hamilton, Ontario
Export Sales: Geon International Corp., Great Neck, New York

C/R Products: C/R Shaft and End Face Seals • Sirvene (synthetic rubber) molded parts • Sirvis-Canpor mechanical leather cups, packings, boots • C/R Non-metallic Gears • C/R Rawhide and nylon hammers.

CHICAGO RAWHIDE

Unique Transfer Idea Solved This Problem:

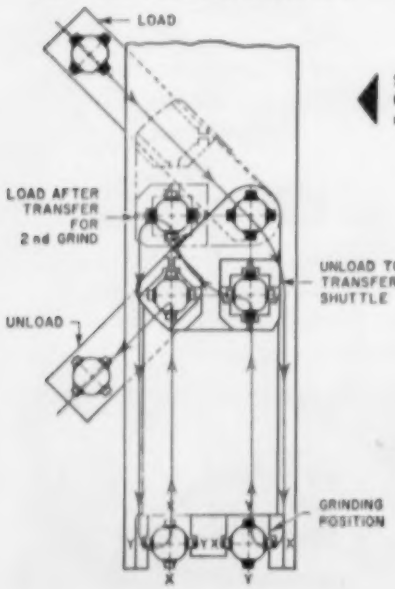
Automatically Grind Four Diameters of Universal Joint Spiders in One Cycle



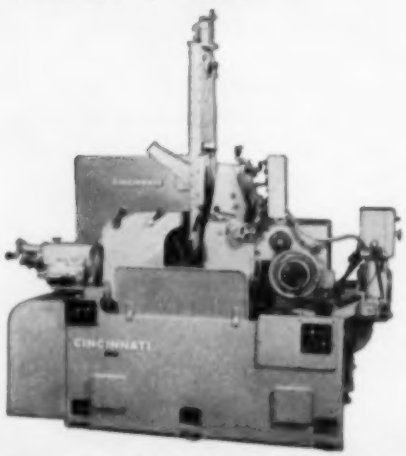
Two universal joint spiders are in process at the same time, grinding two pin diameters on each of two parts. Estimated production, 300 completed parts per hour.

Everyone familiar with universal joint spiders will agree that it's a neat trick to automatically grind the two pin diameters on each of two parts at the same time. Cincinnati automation specialists devised a way to do the job on a new CINCINNATI® FILMATIC No. 2 Centerless Grinder. A unique transfer mechanism, incorporated in the loading fixture developed by Cincinnati for the machine, was the key to this low-cost method of production. Principle of operation is diagramed below at the left. ¶ The manufacture of universal joint spiders may not be your line of work, but some type of precision cylindrical grinding is required in your shop, and Cincinnati grinding and automation specialists can help you do a better job at lower cost. You can be sure that these men will give you the benefit of the most advanced thinking in centerless grinding methods, backed up by 33 years' experience. May we hear from you?

CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO



Schematic drawing of loading and transfer fixture. Parts are ground on axis X in one station, and axis Y in the other.



CINCINNATI FILMATIC No. 2 Centerless Grinder, equipped to automatically grind universal joint spiders. You will find brief information on the standard No. 2 machine in Sweet's Machine Tool File. For complete data, write for catalog No. G-644-1.

CINCINNATI

CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

Clark A. Ralph: Expansion Director

"DIRECTOR OF EXPANSION."

Those words are on Clark Ralph's office door, at Wales-Strippit Corp., North Tonawanda, N. Y.

It's a title new to metalworking, born of an expanding company's need to make one office responsible for these diverse activities. Such an assignment will vary from company to company. Here's how Mr. Ralph defines his:

1. "You must co-ordinate expansion moves so that production can continue without interruption.

2. "Probable trends of future expansion must be considered, so there's a minimum of wasted time and motion in any one move."

Qualifier—Mr. Ralph joined W-S in 1942 as general superintendent. Previously, he held important engineering posts with two other metalworking companies. In addition to his new job, he is plant engineer.

Right now, he is involved in the company's largest expansion, shifting operations to a new location in western New York. "As the job now stands," he says, "the big problem is to move facilities to our much larger quarters and at the same time maintain both plants in production with a minimum of down time. Most important is keeping customer service at a high level during the move." The company plans to double its capacity in the new plant.

Action—Mr. Ralph oversees the buying of extra equipment needed to increase over-all output. He also is supervising the erection of the offices and the location of equipment in the new plant. Using the team concept, he draws on ideas from the plant superintendent, from tool and methods engineers.

Organization—Reporting to him are the assistant plant engineer, all maintenance and repair crews, movers and riggers. He in turn reports to the works manager.

Mr. Ralph points out that at his company market research is a function of sales under the sales manager. Long term growth plans and the probable nature of markets are also a function of sales and are set up by top management.

Trend—The details of an expansion program will vary from company to company, but the co-ordination of its many facets poses a problem common to all. An approach like this one is bound to catch on.

South America: A Reviving Market for Machine Tools?

(U.S. cutting tools only)

*STEEL estimate
Source: U.S. Commerce department

Sales Looking Up in S. A.

It's no bonanza for metalworking exports yet, but machine tool builders expect to make more sales through concentrated efforts of three co-operative groups

THE sales manager for a machine tool builder was seated beside a veteran agent for another U.S. firm on a plane to Rio. The young sales manager was excited about his first trip to Latin America: "You know," he said to his companion, "this South American market is really a comer."

Replied the veteran: "Young man, this market has been a comer for 30 years. Just when do you expect it to finally pop?"

Truth Will Out—That incident took place 16 years ago, and there's still a tendency to regard our business relations with South America with the same indifference. At least three organizations are trying to do something about it.

Amtea Corp. and Machine Affiliates Inc. of New York, and Amertool Services Inc., Cincinnati, are companies formed by machine tool builders to develop and service metalworking outside the U.S. Amtea and Machine Affiliates concentrate in South America, while Amertool does about 40 per cent of its business there.

The size of a member company determines its degree of ownership. Warner & Swasey Co., Cleveland, for example, owns 37 per cent of Amtea's stock. Member companies are not competitive within their own organizations, but the three groups compete with each other.

Reviving Market — Now there does seem to be reason for expecting increased sales in South America. In a booming world economy, however, the Latins will have to do better than average to make the market "pop." The Department of Commerce reports that machine tool exports to South America in the first six months of 1956 are about 20 per cent ahead of those in the same period of 1955; but those figures (see chart) include both new and used tools.

Nelson F. Caldwell, vice president and export manager, Cincinnati Milling Machine Co., Cincinnati, and head of Amertool, says shipments of new tools are probably less in the first half of this year than they were last year in the same period.

Optimistic—Mr. Caldwell is not pessimistic. He believes about 50 per cent of Amertool's business should come from South America (rather than the current 40 per cent), and that the best prospects include Chile and Brazil. The rising price of copper is starting to help the Chilean economy. There's also new interest in capital expenditures in Brazil.

Before the year is over, he believes new tool sales will improve over last year's. South America is still in the early stages of its development, with steel and oil as clues to how speedy its growth can be. Mr. Caldwell also points out the higher wages being paid to Latin American workers: Increased purchasing power will bring a demand for consumer durables and consequently spark industrial growth.

Government Act—Operating in Latin America under provisions of the Webb-Pomerene Act and subject to the authority of the Federal Trade Commission, these co-operatives have the opportunity to tap a growing market because advances in metalworking have been made with little in the way of a basic machine tool industry to support them.

These firms are entitled to special tax benefits under the provisions of the Webb-Pomerene Act, but there's some complaint that it's a nuisance to apply for the benefits and that they are pretty small.

Noble B. Clark, sales manager, machine tool division, Warner & Swasey, reports that 92 per cent of his division's exports are to Europe. The other 8 per cent cover the rest of the world. "That leaves a thin Latin American market, so you can see why 15 or so machine

tool builders would band together." Amtea has three functions, sales, advertising and promotion.

All the groups can follow through on a sale through their local dealers. This creates confidence in the product and furthers good will.

Opportunity — Mr. Clark sees new branch plants of U.S. manufacturers in South America as the best immediate hope for more machine tool sales.

The Suez crisis is important in this area, too. A good percentage of W&S's sales of bigger lathes overseas are to oil fields. If Venezuelan oil booms as a result of Suez, he feels it will help machine tool sales accordingly. The big problem is to educate the Latins to the need for first-class equipment, believes Mr. Clark. As yet, their industry is not mature enough to make such equipment pay.

Competition—So the Germans, British, Italians and Japanese hold the competitive price edge over Americans by an average of 40 per cent on tools for similar applications. "We've been outpriced by as much as 100 per cent on some types of tools," reports Mr. Clark. Tools not requiring the high degree of accuracy associated with American makes are the toughest competitors.

The Japanese have been particularly active in Latin America recently and are threatening the supremacy the Germans have held for the last two or three years. Credit also presents problems for American exporters. Both Britain and Germany can offer better terms at lower rates than Americans can give, and Britain guarantees its exporters 75 per cent of any loss they may have.

Best sign of improvement in sales: The dollar shortage in South America is not quite as acute this year as it was last year.

Sprague Electric Buys

Creas, a capacitor manufacturer in Milan, Italy, has sold a controlling interest to Sprague Electric Co., North Adams, Mass. Sprague made the purchase because import restrictions and dollar shortages have closed the fruitful electronics market in Europe and the Near East.

World Steel Capacity: Headed Up

(Thousand net tons)

	1956	1960
United States	128,363	143,000
Canada	5,525	6,000
Latin America	3,728	7,130
Free Europe	95,340	118,760
Other Free World Countries	17,915	26,075
Free World Total	250,871	300,965
Soviet Orbit Countries	76,245	107,290

Source: U.S. Commerce department

U.S.: World Steel's Angel

Free World steel capacity will jump 20 per cent by 1960. To help keep balance with Soviet orbit countries, U.S. will continue to pour money into this expansion

SINCE 1940, the U.S. government and the World Bank have been backing the expansion of iron and steel industries in friendly nations. This direct and indirect financial aid adds up to more than $866 million.

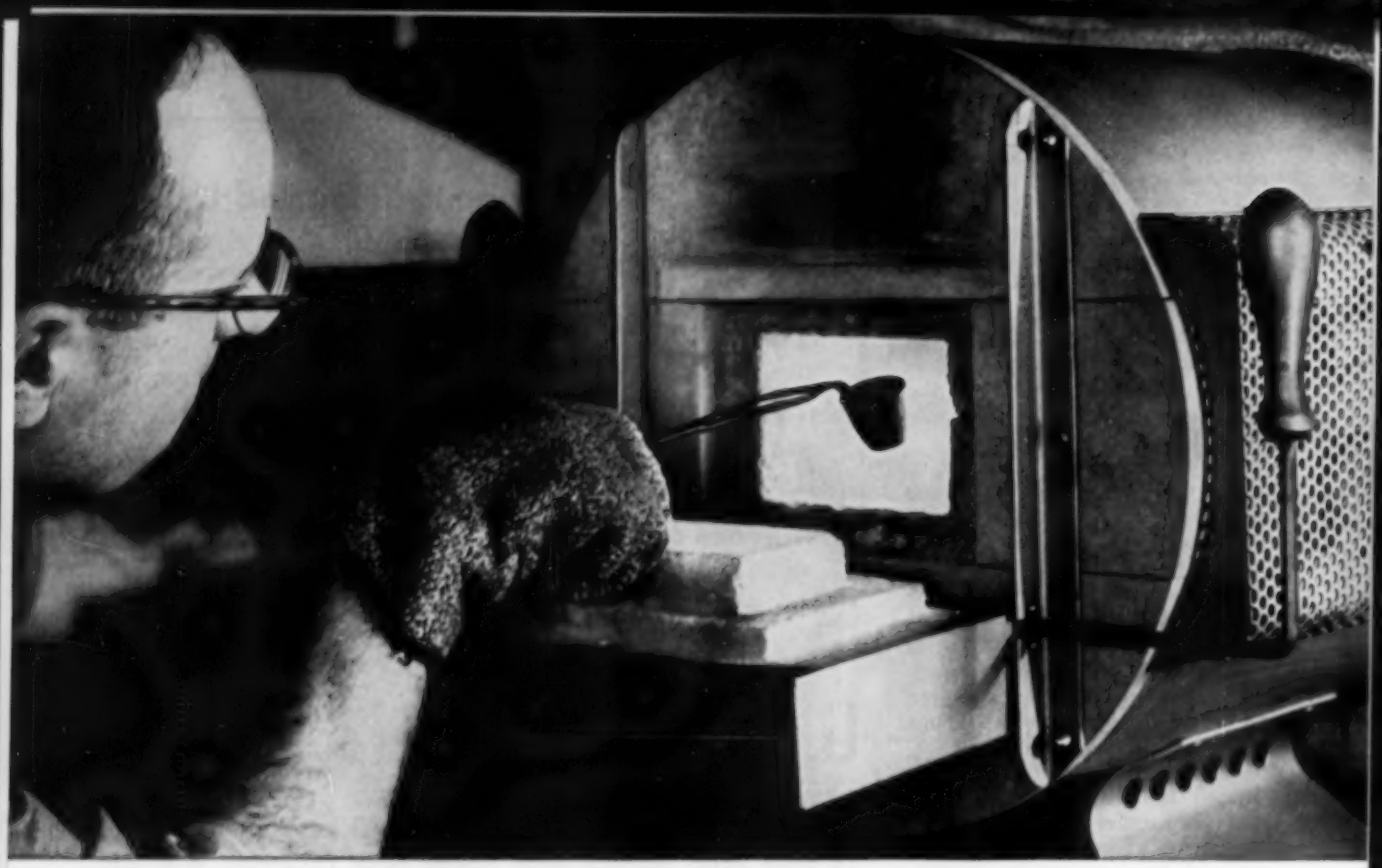
The Business & Defense Services Administration of the Commerce department gives these results: "Between 1937 and 1955, Free World ingot production has increased 87.1 per cent, from 122.2 million to 228.7 million net tons."

Outlook—Neither the expansion program nor the U.S. help required to stimulate it is expected to taper off in the near future. Soviet orbit countries are betting on increasing their share of world steel capacity from 23.2 to 26.3 per cent by 1960—not a radical percentage gain, certainly, but any gain at all is significant, since Free World countries are expanding their own facilities as fast as possible.

Some observers are betting on a continued world-wide steel shortage. Not only has the rise in Free World demand been sharper than anticipated, but it is giving no signs of letting up. Demand for consumer durables is strong. And, in addition, points out BDSA, there's the pressure from underdeveloped countries to introduce a rising measure of industrialization and to better their living standards.

Financing—This proposed additional capacity and the maintenance and replacement of existing equipment present a difficult problem, accented by rising costs throughout the world. Many countries building new or expanding existing steel mills will have to import some or all the equipment needed. Results will be an accentuation of existing exchange problems. There will be a heavy drain on available local capital.

Helping Hand—Until early this month, American steel companies, though they had helped Free World steel by technical assistance, had never directly invested. A first was announced Oct. 4 by Armco Steel Corp., Middletown, O. It will put an initial investment of about $500,000 into a steel fabricating company which will be jointly owned by August Thyssen Huette A. G., Duisborg-Hamborn, Germany.



How Great Lakes Steel *blends* quality

COKE OVENS eject tons of flaming, quality controlled coke into cars for rapid delivery to quencher. Then . . .

SAMPLES ARE ANALYZED carefully to determine the amount of sulphur in the coke used in the blast furnaces.

Take five kinds of carefully selected soft coal. Blend well. Bake in a 2500° oven for 15½ hours. And if every step has been checked and double checked, the way it is at Great Lakes Steel, *presto!* You get pure, hard coke—the vital ingredient for reducing ore to high-quality pig iron.

Above, you see Great Lakes special coke recipe (cut in millionths, of course) being checked for ash impurities, a very important step in the complete analysis.

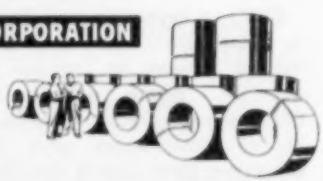
First, a sample of each kind of coal is burned to a cinder in the test furnace. Then the painstakingly mixed blend gets this dress rehearsal heat treatment, too. And this makes doubly sure that the blast furnaces produce quality iron . . . iron to make steel that meets customer specifications *to the letter!*

Quality control from raw materials to finished product—that's Great Lakes Steel! May we help you?

GREAT LAKES STEEL CORPORATION

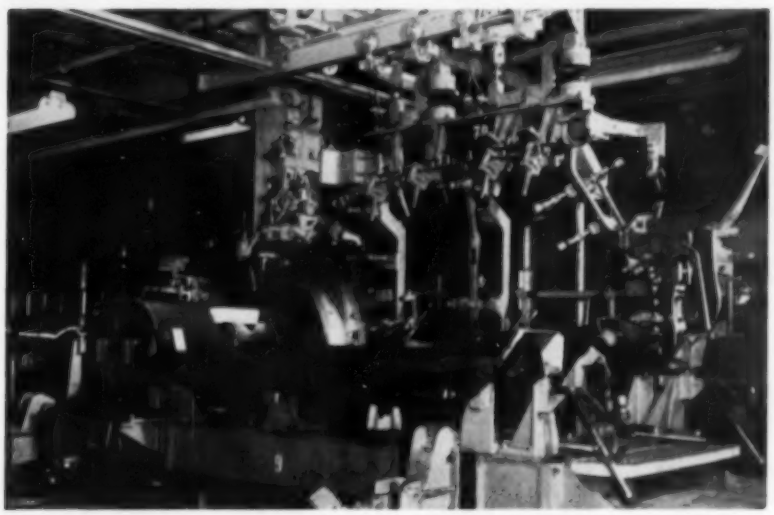
Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION



District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

Body drop on one of Dodge Division's final assembly lines



Gateline fixture joins floor pan truck on Dodge assembly line

Dodge Revamps Line

PRODUCTION engineers at Chrysler Corp.'s Dodge Division have pushed through one of the biggest assembly line change-overs of the year in a little less than a month.

Finishing touches aren't all on, but 24 miles of conveyors, fixtures and other tooling were ready to go by Sept. 15. Dodge phased out its 1956 production Aug. 15.

Backstage—Most persons are interested only in what 1957 cars will look like and what engineering changes have been made. Few realize the effort that goes into setting up production facilities for a new model.

M. C. Patterson, Dodge president, sums it up: "The complete retooling of the plant, arrival of fixtures and equipment from all over the country and the establishment of inventories of parts are done in accordance with a precise, 24-hour, seven-day-a-week schedule."

Line-Up—Although the division underwent a complete overhaul this year, some of the changes are duplicated annually by every car builder. Figures aren't available, but it's estimated that Dodge change-over costs, excluding model tooling, run over $2 million. Here's where some of the money went.

"We tossed out all multiple line supply conveyors. Each final and subassembly line now has its own separate system. If one line shuts down, we won't have to rephase the flow of materials for another line," reports Dick Vining, production engineering manager.

Chassis — Overhead conveyors have replaced floor carriers on the two chassis assembly lines. They increase productive capacity, cut down time by making for easy maintenance.

Automatic machinery which feeds parts is being installed around the circular conveyor where brakes are assembled. Mr. Vining says six heavy duty stamping presses have been added to the press plant.

A new assembly machine which welds radiator yokes also has been purchased for '57 cars.

Gateline—The biggest change is the switch to gateline fixtures for body and quarter panel assembly. In this system, all side and quarter panel sections of the metal body shell are placed in vertical fixtures. They are attached to a moving truck which holds the floor pan. Doors, roof and rear deck are welded in place as the huge fixture moves down the line.

At the end of the line, the fixtures slide away on overhead tracks. Bodies-in-white slip into a long booth for touch-up welding, cleaning and soldering operations. The plant has two of these lines in operation on one floor.

Comparisons — The setup is called gateline because the upright fixtures have a gatelike appearance as they swing into the assembly line. The older method, still used in many plants, is to assemble side members of the body

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in a horizontal position, then fasten them onto the floor pan a section at a time.

Mr. Vining points out that the gateline method holds all body parts firmly in place through the whole welding process. It provides improved quality of panel fit.

The setup is so effective that Dodge has extended it to quarter panel assembly lines. Fixtures containing quarter panel parts and braces move down a continuous line to be welded into a single unit. Similar systems in GM's Fisher Body plants work on stationary fixtures. It is believed Dodge is the only plant with the continuous flow method applied on quarter panel assembly.

Mock - Up — "Most of this wouldn't have been possible if it hadn't been for our boot camp plant," says George H. Stover, Dodge's manufacturing manager of car operations. (Boot camp was a pilot model operation set up in Dodge plant No. 4 early this year.)

The pilot gateline is a shorter, full-scale version of the present system. Engineers "bugged out" most of the headaches facing them on the change-over. The model line also turned out bodies while final gateline units were being installed in the main plant.

Small World — "Our biggest headache is geography," mourns Mr. Stover. The plant is in the center of Hamtramck (Detroit suburb) which means problems in just getting materials into and out of the area. Two receiving docks have been added to help ease the situation.

Another problem is plant layout. The eight-story Dodge facility is more than 40 years old. The first Dodge car rolled out its doors in 1914. Trying to fit modern equipment for all phases of manufacturing and assembly into the nooks and crannies keeps engineers humping.

Concludes Mr. Stover: "We still believe a straight line is the shortest distance between two points, but sometimes we have a tough job proving it!"

Engine Revolution Talk

The free piston-gas turbine debate got another whirl at the Detroit chapter meeting of the Society of Automotive Engineers.

George J. Huebner Jr., Chrysler's executive research engineer, hails the gas turbine as the salvation for future power plants. Scarce metals requirements, the acceleration lag, lack of engine braking and cost reduction already are solved or well on the way to solution, he claims.

New production techniques will be needed to make the gas turbine because most parts are different. It has about one-fifth the parts of today's engine and one-half as many parts as the experimental free piston engine, he explains.

Rebuttal—On the other side of the fence, Dr. Donald Frey, associate director of Ford's Scientific Laboratory, told the SAE that the free piston, turbine engine already compares favorably with today's jobs in throttle response, fuel economy and manufacturing costs.

He admits the weight per horsepower (more than 3 lb) still is much higher than comparable weight-horsepower ratios of present power plants. In addition, the full load life of the free piston gasifier at these design weights remains uncertain.

It's worth noting, however, that Ford has added the turbine term to its free piston moniker. The F-P job really is a combination piston gasifier to provide power and a turbine which turns it into driving power.

Says Dr. Frey: "The free piston-turbine engine could be adapted to split installations in passenger cars—gasifier in front and power turbine in rear. This would eliminate the driveline tunnel and provide good weight distribution."

General Motors is out of the discussion for the moment. It has already dragged out samples of each type engine. The outlook still remains: Conventional piston engines for some time to come (five to ten years). The gas turbine gets a slight nod as initial replacement, but the free piston eventually offers more advantages to auto styling and engine manufacturing.

Rumors have it that at least one of the auto makers is experimenting with a reciprocating piston engine which has a 17:1 or 18:1 compression ratio.

U.S. Auto Output

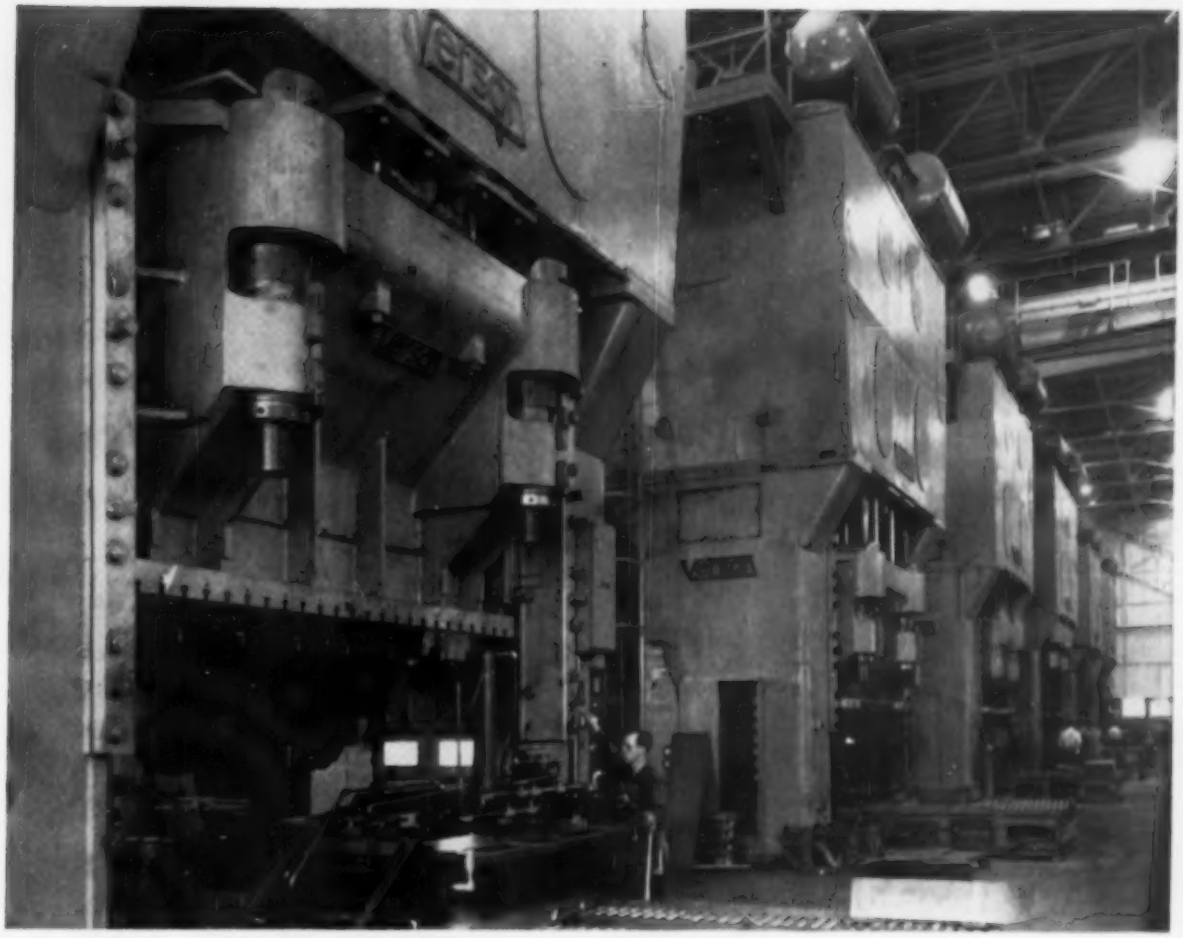
Passenger Only

	1956	1955
January	612,079	659,508
February	555,596	675,495
March	575,234	794,015
April	547,766	753,851
May	471,533	724,892
June	430,279	649,393
July	448,804	659,763
August	401,996	614,493
September	190,709†	461,591
9 Mo. Total	4,233,996†	5,993,001
October		517,813
November		749,061
December		682,257
Total		7,942,132
Week Ended	**1956**	**1955**
Sept. 15	64,350	122,263
Sept. 22	35,652	123,109
Sept. 29	43,369	115,723
Oct. 6	59,351	80,271
Oct. 13	72,064†	101,581
Oct. 20	79,100*	137,425

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Exhaust Notes

- Chrysler research engineers are using thin aluminum discs which spin through test solutions up to 12,000 rpm to check corrosion of aluminum radiators. It's called the flying saucer technique.
- Approximately 10,800 employees will be added to Fisher Body payrolls by Dec. 1, says James E. Goodman, GM vice president and Fisher Body general manager. It will bring Fisher Body employment to 81,200.
- A Studebaker-Packard stockholder charges shareholders were misled about the Curtiss-Wright contract. Initial reports supposedly had it that S-P would get additional defense contracts, but S-P contracts went to a C-W subsidiary. The alleged misinformation supposedly came in the management proxy sent to shareholders last month. The defense contracts had been published about six weeks before that time.
- Pontiac's thermosetting plastic car finish (Lucite acrylic lacquer) will be standard on all 1957 Pontiac custom models, reports S. E. Knudsen, Pontiac general manager.



Could you compete with a press room like this?

the RISING COST of Obsolescence

Obsolescence is the creeping malignancy of manufacturing. The longer it goes unchecked, the weaker its victim becomes, the more costly the cure. Recent developments by Verson in the press forming of metals have obsoleted processes that were the most efficient available a few short years ago. Check your plant for symptoms.

Unless you're in the automotive industry you probably won't have to compete with this particular press room. But, if you make anything that is pressed out of metal you probably will have to compete with a press room equally modern and efficient.

What does this mean to you?

Competition that reaches its culmination in the market place often begins in the shop. Here is where a large measure of your competitive price position is determined. Here is where profits can be made—or lost.

What's the answer?

The answer is a *planned* program of modernization of your production processes. Sit down with your suppliers and develop a program for systematically replacing inefficient, obsolete methods. Generally, you need not replace it all at once. Very often one machine at a time can be replaced, just so it is done to a well developed plan.

In your press room, sit down with Verson. Put Verson experience in the development of production processes to work for you. Utilize the know-how that results from Verson's approach to press building—"Anyone can build a press, Verson builds production processes". Write or phone.

A Verson Press for every job from 60 tons up.

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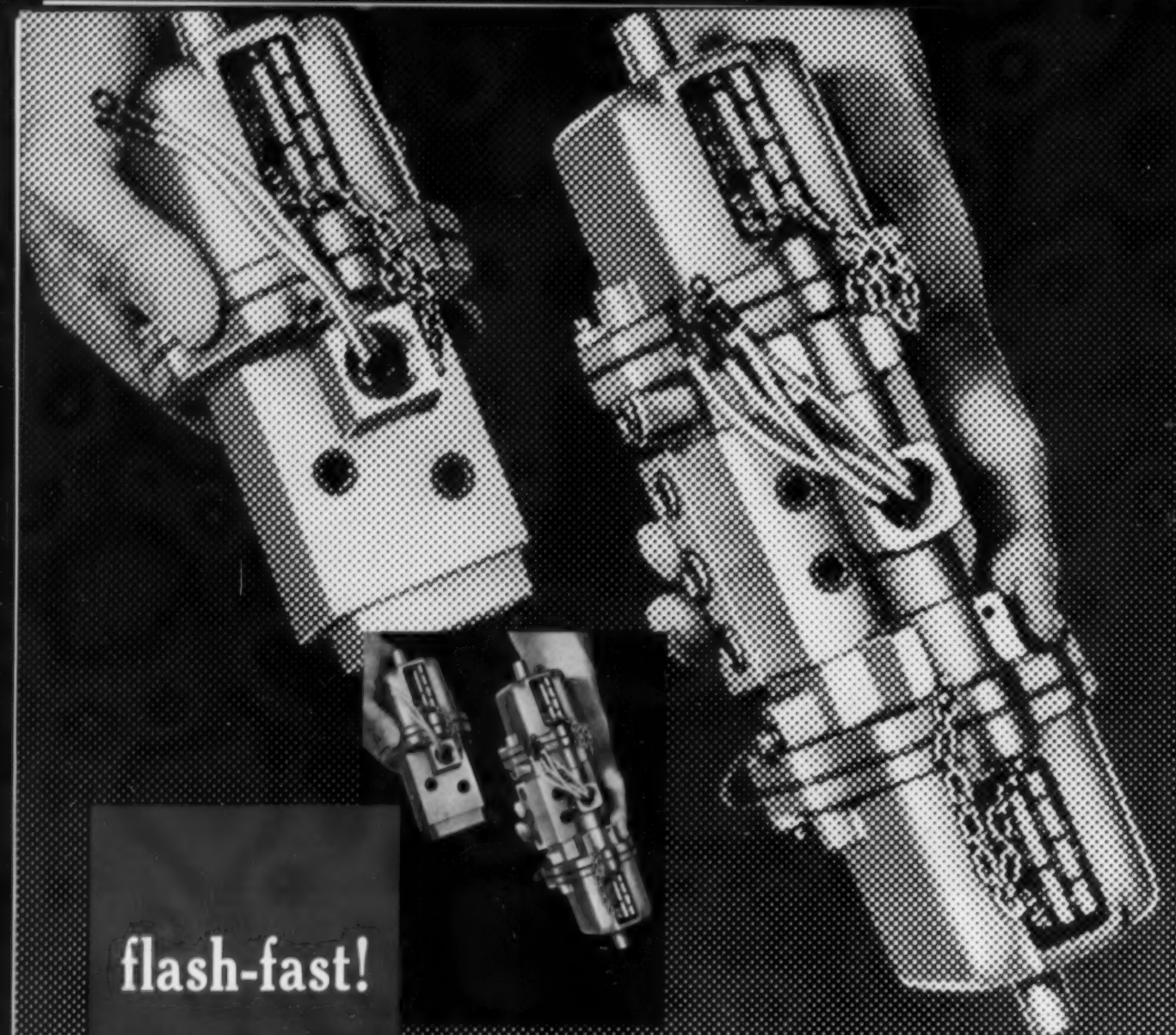

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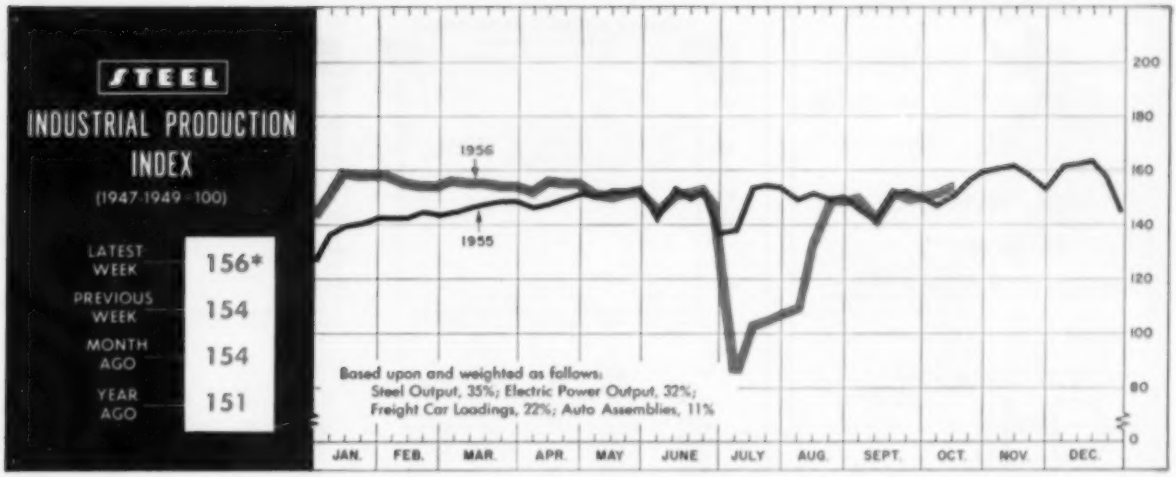

*Week ended Oct. 13.

Annual Profits Head for All-Time High

BUSINESS has outridden the much publicized fall "slump" predicted earlier this year. With the help of record fourth quarter earnings, 1956 will go into the books as the most profitable year ever.

Third quarter reports indicate that increased sales and rising prices will boost the metalworking industry's earnings this year. Rising costs will take some of the glow off the profit picture. In a few cases, companies have been forced to dip into the kitty, and dividends will be reduced accordingly. The 56-day strike spoiled the record pace of steel companies, but their earnings will be high compared with those in any year except 1955.

Your Choice — A sampling of these reports shows predictions of net earnings as high as 100 per cent over 1955's. Harnischfeger Corp., with a fiscal year ending Oct. 31, expects its net to increase by about 109 per cent. Lone Star Steel Co., victim of a 13-day strike, predicts its net will be up about 90 per cent. General Cable Corp. goes even farther in its prognostications: An 83 per cent increase in net earnings this year, with another 20 to 25 per cent increase in 1957. Trane Co.'s net earnings will increase 62 per cent. Its backlog is at a record $28 million.

Most reports are not quite that optimistic, sticking closer to a 5 to 10 per cent increase. Giddings & Lewis Machine Tool Co. estimates its net earnings will be up about 10 per cent this year. A record backlog (200 per cent above that a year ago) assures it of continued good earnings. Vertol Aircraft Corp. has an all-time high backlog of $160 million, which will contribute to "substantially higher" profits this year than last.

Meaning—While profits are important in themselves, there is even greater significance in these statements. They prove once again the basic strength and buoyancy of our dynamic economy. Industry in general is chalking up its biggest year despite the costly steel strike; the poor showing by the

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,504[1]	2,483	2,386
Electric Power Distributed (million kw-hr)	11,400[1]	11,342	10,599
Bituminous Coal Output (1000 tons)	10,405[1]	10,510	9,844
Petroleum Production (daily avg—1000 bbl)	7,020[1]	7,022	6,714
Construction Volume (*ENR*—millions)	$390.2	$498.0	$345.8
Auto, Truck Output, U. S., Canada (*Ward's*)	98,532[1]	84,097	130,778
TRADE			
Freight Car Loadings (1000 cars)	815[1]	815	827
Business Failures (Dun & Bradstreet)	253	251	207
Currency in Circulation (millions)[3]	$30,880	$30,767	$30,552
Dept. Store Sales (changes from year ago)[3]	+2%	+3%	+6%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$19,786	$24,008	$17,526
Federal Gross Debt (billions)	$273.9	$274.2	$280.3
Bond Volume, NYSE (millions)	$14.9	$19.8	$24.9
Stocks Sales, NYSE (thousands of shares)	7,402	10,384	12,213
Loans and Investments (billions)[4]	$85.7	$85.7	$84.6
U. S. Govt. Obligations Held (billions)[4]	$26.0	$26.1	$30.3
PRICES			
STEEL's Finished Steel Price Index[5]	225.58	225.71	225.71
STEEL's Nonferrous Metal Price Index[6]	265.0	264.8	264.1
All Commodities[7]	115.0	115.2	111.2
Commodities Other Than Farm & Foods[7]	123.0	122.9	118.7

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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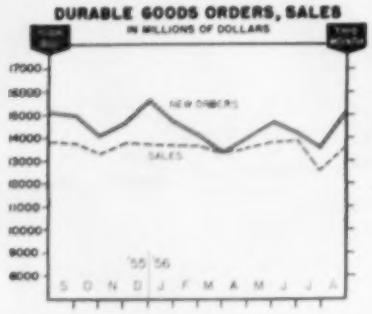
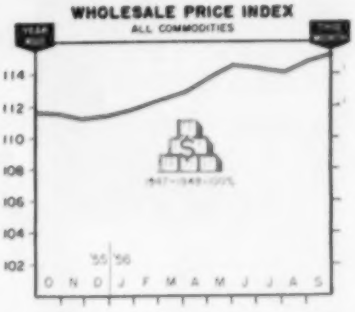
THE BUSINESS TREND





	New Orders*		Sales*	
	1956	1955	1956	1955
Jan.	14,663	12,142	13,595	11,850
Feb.	14,107	12,170	13,593	12,029
Mar.	13,337	13,353	13,294	12,860
Apr.	14,073	12,879	13 519	12,806
May	14,732	14,331	13,754	13,322
June	14,185	14,033	13,850	13,527
July	13,513	13,571	12,627	13,503
Aug.	15,106†	15,145	13,603†	13,745
Sept.	.....	14,936	.....	13 692
Oct.	.....	14,094	.....	13,261
Nov.	.....	14,650	.....	13,721
Dec.	.....	15,605	.....	13,688

*Seasonally adjusted. †Preliminary.
U. S. Office of Business Economics.
Charts copyright, 1956, STEEL.

	1956	1955	1954
Jan.	111.9	110.1	110.9
Feb.	112.4	110.4	110.5
Mar.	112.8	110.0	110.5
Apr.	113.6	110.5	111.0
May	114.4	109.9	110.9
June	114.2	110.3	110.0
July	114.0	110.5	110.4
Aug.	114.7	110.9	110.5
Sept.	115.3	111.7	110.0
Oct.	.....	111.6	109.7
Nov.	.....	111.2	110.0
Dec.	.....	111.4	109.5

U. S. Bureau of Labor Statistics.
*Preliminary.

automotive industry; the off year in agricultural equipment; the dip this spring in appliances; and the drop in residential construction. Corporate earnings will top the $42.7 billion reported last year. Dividend payments will pass the $12 billion mark.

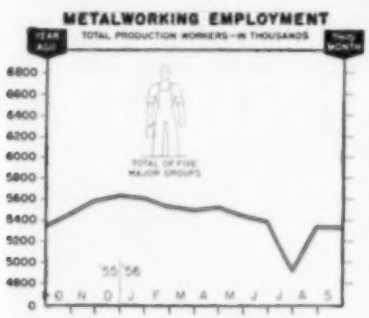
With money and credit the tightest they have been since the mid-thirties, it's impossible to estimate the full value of this increased profit on capital expenditure programs. One thing is certain: Business optimism is about as high as it has ever been, and metalworking has shown no significant signs of cutting back on its expansion plans. In fact, businessmen indicate they will spend $420 million more on construction and capital goods in the fourth quarter than they thought they would six months ago. Much of this money has to come from profits. Much of the confidence that keeps the program rolling comes from optimism concerning future profits.

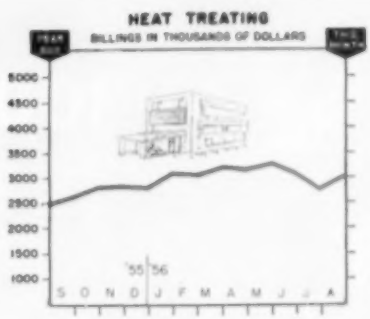
Orders, Backlogs Rise

That optimism is bolstered, at least for the near future, by the rate at which new orders are coming in (see chart above) and the accompanying rise in unfilled orders. August figures from the Department of Commerce represent the rapid comeback after the steel strike. While new orders for all manufacturing showed a significant gain (from July's $26.998 billion to $28.956 billion), the most spectacular advance was in durable goods. This was caused largely by reopening of steel mill books, but purchasing agents throughout metalworking report increased activity. Sales, which were close to the year's high mark set in June, still lagged behind orders—another indication that many industries are already operating at capacity levels. Durable goods backlogs, which have increased $3.4 billion since June, are at the all-time high. Total business inventory made a slight gain in August, but durable goods industries cut down on stocks for the first time since January, 1955.

Tight Credit Overrated

While much has been said against tight credit, there is little concrete evidence that the Federal Reserve's policies have had much of a dampening effect on business. Consumer debt is still on the up-





1955	Prim. Mtls.	Fab. Prod.	Mach. Inery	Elec. Mchy.	Trans. Equip.
Oct.	1,118	921	1,206	880	1,344
Nov.	1,133	933	1,225	866	1,446
Dec.	1,141	928	1,250	868	1,471
1956					
Jan.	1,141	913	1,261	854	1,449
Feb.	1,138	899	1,274	849	1,392
Mar.	1,130	893	1,281	842	1,354
Apr.	1,136	896	1,292	874	1,332
May	1,117	881	1,281	872	1,295
June	1,118	870	1,278	866	1,269
July	743	828	1,264	854	1,250
Aug.	1,103	864	1,259	875	1,245
Sept.	1,112	873	1,270	885	1,200

*Preliminary.
U. S. Bureau of Labor Statistics.

	1956	1955	Per Cent Gain Or Loss*
January	3,062.8	2,181.0	+ 41.4
February	3,045.2	2,184.5	+ 39.4
March	3,226.2	2,899.5	+ 34.1
April	3,172.0	2,579.5	+ 23.0
May	3,292.3	2,644.4	+ 24.5
June	3,094.5	2,645.1	+ 17.0
July	2,762.5	2,180.0	+ 26.7
August	3,040.7	2,439.3	+ 19.9
September		2,887.6	
October		2,785.1	
November		2,809.1	
December		2,788.6	
Total		29,601.2	

*Compared with year-ago month.
Metal Treating Institute.

grade, although at less than the unprecedented 1955 rates. The wholesale price index is moving up at about the rate expected after the steel strike (see chart, page 64), and new price hikes are still being announced. Residential construction is holding at the annual rate of about 1.1 million starts a year, but there is increasing doubt that tight credit is the big factor here. Many builders contend that the industry overbuilt in its rush to satisfy the market in late 1954 and early 1955. In addition, family formations are temporarily on a slight downtrend.

The Federal Reserve Board itself has been responsible for watering down the full effects of stringent credit. C. Canby Balderston, vice chairman of the Board of Governors, says that the FRB intends to supply sufficient funds to cover essential credit needs. With corporate and personal income at record highs, the cost of borrowing seems to be no barrier if the money is available.

Index Goes for Record

STEEL's industrial production index made its first move for a record when it advanced to a preliminary 156 (1947-1949=100) in the week ended Oct. 13. This was the highest level since 157 was posted in the week ended Apr. 28. From now until Christmas, the general direction will be up, allowing for minor seasonal deviations in November. The main force behind the drive is the automotive industry, despite its current new model production problems. As these kinks are ironed out, assemblies will reach top levels and push the production index to 160 within the next two weeks.

Employment Climbs

Nonfarm employment climbed to the all-time high of 52,131,000 in September, reports the Bureau of Labor Statistics. This was 135,000 above the previous high mark set last December. Manufacturing employment rose 24,000 to about 17.1 million. Of the major metalworking industries (see chart above) only transportation equipment was down from August as Detroit went into model changeovers. With the recall of workers in that industry, the figures for metalworking employment in October will be close to the 1955 peak.

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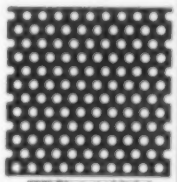

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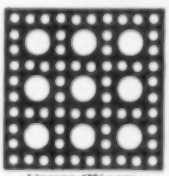

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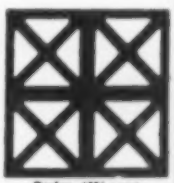

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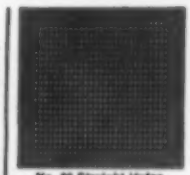

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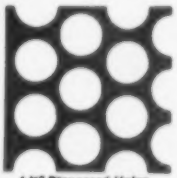

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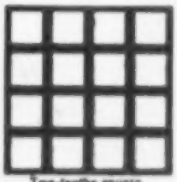
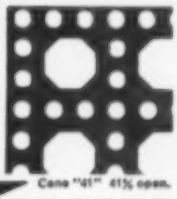
See our catalog in Sweet's Product Design File.



Two-tenths square, 60% open.

Round holes, square holes, slots, ornamental patterns, oblong holes, oval holes.



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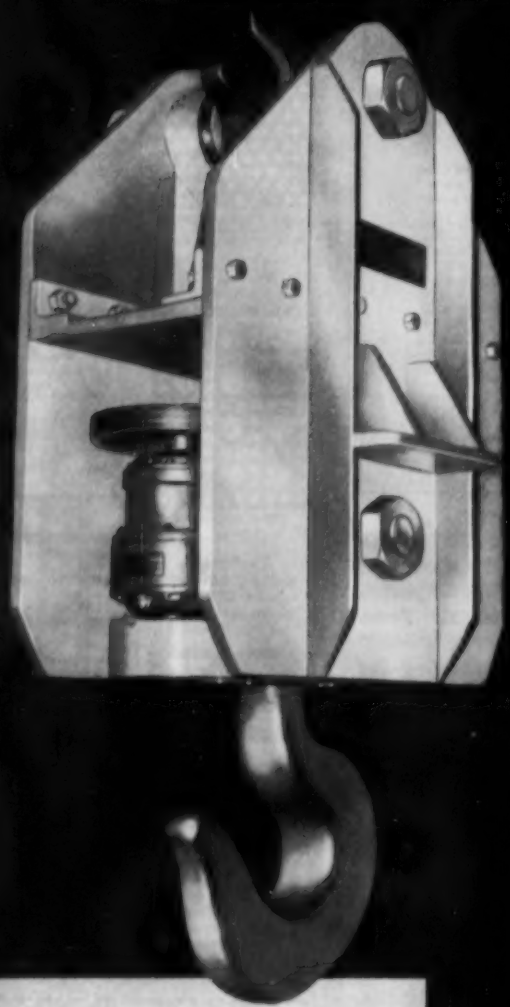
another step in . . .

PRODUCTIVITY

the Motorized Rotating Crane Hook

by HEPPENSTALL



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Features of this new Crane Hook are:

1. Turns all sorts of loads such as: coils, sheets, rolls.
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3. All operations of the Heppenstall Motorized Rotating Crane Hook are controlled by the craneman from his cab.
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5. Capacities for largest industrial cranes.

Used with a "C" hook, the Heppenstall Motorized Rotating Crane Hook permits a coil of steel to be turned horizontally as it is lifted.

Electric motor furnishes power for turning the hook. Motor can be supplied to meet your current characteristics.

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. . . tongs for every lifting problem.

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Send for this new catalog. It provides you with the solution to many lifting problems. Address: Heppenstall Company, Pittsburgh 1, Pa.

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Horizontal Coil Tong over ends

Tongs for lifting groups of rounds

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JAMES D. BARLOW
. . . Leece-Neville purchasing agent

ELMER D. ROBINSON
. . . Morse Chain manufacturing director

LOUIS G. HELMICK
. . . Joy Mfg. v. p.-industrial division

James D. Barlow was appointed purchasing agent for **Leece-Neville Co.**, Cleveland. He joined the firm in 1955 and was made a buyer in January of this year.

Edward E. Helm was elected president, **Reliance Electric & Engineering Co.**, Cleveland. Former vice president and general manager, he succeeds **James W. Corey**, now chairman.

Henry J. Forsyth was made director of steel conservation and quality control for the Youngstown district, **Republic Steel Corp.** He was assistant director, steel conservation and quality control, at Cleveland.

Matthew J. Donachie, former president and chief metallurgist of Beryllium Corp., was made works manager of **Prentiss Wire Mills**, Holyoke, Mass., a unit of Riverside Metal Co. Division, H. K. Porter Company Inc.

Roy E. Pinniger was promoted to assistant to the president, **American Steel & Wire Division**, U.S. Steel Corp., Cleveland. He has served for the last 20 years as vice president-general manager, Cyclone Fence Dept. **James E. Brown** was elected vice president of the wire division and general manager of Cyclone Fence. He continues headquarters at Waukegan, Ill., where he was general superintendent.

Elmer D. Robinson, former assistant to the president, was appointed director of manufacturing, **Morse Chain Co.**, Ithaca, N. Y.

G. W. Kelch was appointed president of Borg-Warner Corp.'s recently acquired **Ingersoll-Humphryes Division** at Mansfield, O. Previously executive vice president of the division, he succeeds **D. J. Jones** who was granted an indefinite leave of absence.

Llewellyn F. Hutchinson was elected vice president-operations, **Precision Drawn Steel Co.**, Camden, N. J. He was superintendent, Newark division, Wyckoff Steel Co.

Richard J. Brown, formerly chief engineer at Perfection Industries Inc., joined **Crescent Metal Products Inc.**, Cleveland, as chief engineer.

James J. Nance, former president, Studebaker-Packard Corp., was elected vice president-marketing, a new position at **Ford Motor Co.**, Dearborn, Mich. He will also serve as a member of the administration committee and as chairman of the merchandising committee.

Frank A. Mitchell was named general sales manager, **Henry Disston Division**, H. K. Porter Company Inc., Philadelphia. He was director of marketing at York-Shippley Inc.

Joy Mfg. Co., Pittsburgh, named **Louis G. Helmick** to the new post of vice president-general manager, industrial division. Similar appointments were made in the coal machinery division which **Hugo C. Nyquist** heads and in the mining and construction division, headed by **James A. Drain.**

L. Nevin Schwien was elected executive vice president in charge of engineering and production at **Burton Mfg. Co.**, Santa Monica, Calif.

Edward A. McNally was named manager of **Electric Auto-Lite Co.'s** wire and cable plant at Port Huron, Mich.

In reorganization of its management structure, **Brown & Sharpe Mfg. Co.**, Providence, R. I., named **Wallace B. Bainton** vice president-general manager for machine tools; **Wallace E. Anderson**, vice president-general manager for industrial products. Mr. Bainton formerly held the title of vice president-production and engineering; Mr. Anderson, general sales manager. Aiding Mr. Bainton in the machine tool division are **Charles M. Evans**, manufacturing manager; **Harold Sizer**, director of design; **Alfred L. Hurst**, assistant. In the industrial products division **William A. McGregor** is manufacturing manager; **Kenneth V. Gordon**, director of production order-

EDWARD C. PETERSON
. . . Birdsboro v. p.-rolling mill equip.

DR. I. A. OEHLER
. . . American Welding v. p.-operations

L. F. VAN NORTWICK
. . . Progressive Welder appointment

ing; **Harold B. Schott**, general sales manager.

Edward C. Peterson was elected vice president, rolling mill equipment division, **Birdsboro Steel Foundry & Machine Co.**, Birdsboro, Pa. He succeeds **Edward T. Peterson** who continues with the company as senior engineer.

Rear Adm. Paul E. Pihl was elected chairman, **Hupp Aviation Co.**, subsidiary of Hupp Corp., Chicago.

Robert M. Clark was named manager of sales, **Precision Steel Corp.**, Bridgeport, Conn. He previously spent 24 years in sales with Stanley Works Steel Division.

Thompson Products Inc., Tapco plant, Cleveland, named **Arthur J. Davidson Jr.** associate director, staff research and development (automotive); **James E. Yingst** was made manager of this department.

E. J. Reitler fills the new post of assistant sales manager for **Firth-Loach Metals Inc.**, McKeesport, Pa. He was vice president-sales, Carbidie Inc.

Archie N. Colby was made general sales manager, **Greer Hydraulics Inc.**, Jamaica, N. Y. He has been with a management consulting firm.

Robert F. Gilman was made production engineer, **Brooks Rotameter Co.**, Lansdale, Pa.

Dr. I. A. Oehler was elected vice president - operations, **American Welding & Mfg. Co.**, Warren, O. Formerly administrative assistant, he became manager of manufacturing last year.

Joseph D. McCoy, general manager, was elected a vice president of **Anderson Metal Products Inc.**, El Cajon, Calif.

Richard W. Banfield succeeds **Charles B. Lansing** as president and chief executive officer of **Motch & Merryweather Machinery Co.**, Cleveland. He was executive vice president of Niles-Bement-Pond Co.

RICHARD W. BANFIELD
. . . heads Motch & Merryweather

Progressive Welder Sales Co., Detroit, named **L. F. Van Nortwick** general sales manager, **Frostrode Division**, Warren Alloy Division. **Bernie Walker** was made assistant director-manufacturing for all divisions; **Earl R. Stiefel**, director of purchases. **George W. Enk** was named general sales manager for U.S. and Canadian operations; **E. J. Formhals**, general manager, Canadian plant, at Chatham, Ont.

James F. Pichiotino was made midwest area sales manager for **Redmond Co. Inc.**, Owosso, Mich.

Harry J. McMahon was made assistant to general manager, Martins Ferry, O., factory, **Wheeling Steel Corp.**

William C. Greenleaf was named manager, metals development, for **U.S. Industrial Chemicals Co.**, division of National Distillers Products Corp., New York. He is responsible for market development and sales of zirconium and titanium sponge which will be produced in plants under construction in Ashtabula, O.

Albert J. Hanssen was made chief engineer, **Conoflow Corp.**, Philadelphia. He held a similar post with Climax Division, Black, Sivalls & Bryson Inc.

Power Products Corp., Grafton, Wis., named **P. B. Terhorst** vice president of a new operating division for manufacturing, product engineering, production control,

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CHARLES A. SHENBERGER
. . . Erie Forge & Steel gen. sales mgr.

RALPH A. PURCELLI
. . . to manage a new Rockwell plant

HENRY GICHNER
. . . heads Fred S. Gichner Iron Wks.

purchasing and quality control. He was works manager, Grantley plant, York Corp.

Charles A. Shenberger was made general sales manager, **Erie Forge & Steel Corp.**, Erie, Pa. He was Indianapolis plant sales manager for Heppenstall Co.

Milan Zedlar was made plant manager, **Smith-Armstrong Forge Inc.**, Cleveland. He is a former president of Kirtland Machine Tool Co.

Rex C. Corns was made assistant general superintendent of **National Tube Division's** Gary, Ind., Works, U.S. Steel Corp.

Milo H. Buzzee joined **Tube Turns Plastics Inc.**, Louisville, to serve on special assignments and to direct marketing of custom molded products.

Ralph A. Purcelli, former assistant general manager of **Rockwell Mfg. Co.'s** gas regulator plant at Norwalk, O., was named general manager of the new Rockwell plant at Statesboro, Ga.

Robert E. Dyas was made manager, contract refrigeration sales, **Perfection Industries Division**, Hupp Corp., Cleveland.

J. D. Alsman was made manufacturing manager, **Toledo Pipe Threading Machine Co.**, Toledo, O.

Robert W. Mullin was named assistant to the general manager of sales at **Pittsburgh Steel Co.**, Pittsburgh. **Rudolph F. Schlentner** was made manager-sheet sales.

Raymond G. Adair Jr. was named production manager, **Fountain Mill Steel & Iron Co.**, San Diego, Calif.

Henry Gichner was elected president, **Fred S. Gichner Iron Works Inc.**, Washington. He succeeds his father, the late **Fred S. Gichner.**

International Resistance Co. appointed **Walter Canfield** sales manager and **Kenneth C. Schaefer,** office salesman at its power resistor and rectifier plant in Boone, N. C.; **John M. Searing,** sales manager, and **Terry A. Halpern,** office salesman, at its Philadelphia plant; **Andrew J. Callanan,** sales manager of its deposited carbon and boron carbon resistor plant at Burlington, Iowa.

At **Jones & Laughlin Steel Corp.'s** engineering department, Pittsburgh, **D. H. Miller** was made planning and development engineer; **R. W. Barnitz,** chief electrical engineer; **Stephen Vajda,** special engineer.

OBITUARIES . . .

John J. Wallace, 67, vice president-secretary, **Great Lakes Pressed Steel Corp.**, Buffalo, died Oct. 6.

Benjamin T. Root, 75, president, **B. M. Root Co.**, York, Pa., died Oct. 8.

Charles E. Bunting, chairman, **Bunting Brass & Bronze Co.**, Toledo, O., died Sept. 29.

Marshall Brier, 66, chief engineer, **Reynolds - McBride Machinery Corp.**, San Diego, Calif., died Oct. 1.

A. R. Anderson, 66, president, **Industrial Instrument Co.**, Cleveland, died Oct. 7.

Oliver J. Jenkins, 58, superintendent, window and door engineering division, **Truscon Steel Division,** Republic Steel Corp., died Oct. 7.

J. Alan Decker, 47, a sales representative for **United States Steel Barrel Co.**, Philadelphia, died Oct. 4 in Elizabeth, N. J.

Robert H. Kitzman, retired vice president-general production manager, **Doehler-Jarvis Division,** National Lead Co., died Sept. 30.

Laurence S. Tilden, 60, Chicago district manager, **Hevi Duty Electric Co.**, died Oct. 3.

Walter A. Weiss, vice president, **Hickok Electrical Instrument Co.**, Cleveland, died Sept. 29.

James S. Kelly, 70, head, **Kelly Foundry & Machine Co.**, Utica, N. Y., died Oct. 8.

new U.S. Steel Research Center installs LOEWY rolling mills

2-high reversing 21" by 30" hot mill for blooming, break-down and finishing. Maximum load 1,000,000 lbs.

4-high reversing 9" and 21½" by 16" cold mill for rolling flats. Maximum load 1,400,000 lbs. Both mills have front and rear tables with adjustable side guards.

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Our natural traffic arteries, the rivers, today bustle with increasing transportation of all kinds of bulk materials. Efficient "parking" facilities, such as this coal loading dock on the Ohio River are needed to load and unload barges at terminal points. Made up of a series of steel sheet pile cells, filled with sand and gravel and capped with concrete, these docks are low in first cost and need little maintenance. The number, diameter and height of cells is determined by dock size and location as well as variations in river level. Two or three or dozens may be used. Large installations, equipped with barge shifting and unloading machinery, have been constructed to handle as many as sixty barges.

More than 100 docks have been built in the last eight years, another example of Dravo's unique construction experience "in and around water." For more information on docks or any of the products and services listed below, write to DRAVO CORPORATION, PITTSBURGH 25, PENNSYLVANIA.

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Plans Ore Reserve

J&L leases taconite ore property for development when additional supplies are needed

A NEW reserve of iron ore will be developed by Jones & Laughlin Steel Corp., Pittsburgh. The property will be held as an idle reserve until additional supplies are needed.

The deposit is in Boston township, near Kirkland lake, Ontario, Canada. The lease was obtained from Dominion Gulf Co., a subsidiary of Gulf Oil Corp.

Economical Project — J&L has drilled the deposit, since taking an option on the property last April. The corporation believes that adequate reserves of magnetic taconite are available to support a mining and beneficiating plant on the property. An economic process of concentrating the taconite to a usable blast furnace ore has been developed.

When production is started, the ore will be mined by open-pit methods, crushed and concentrated magnetically to produce a high-grade product. The concentrate will be pelletized before being shipped to steel plants.

It is expected that pellets will be shipped by rail to J&L plants in Pittsburgh, Aliquippa and Cleveland. All-rail shipment will permit year-round operation of the pits and concentrating plant.

Equipment Makers Join Forces

Acme Precision Products Inc. (formerly Acme Aluminum Alloys Inc.), Dayton, O., and Cal-Tronics Corp., Los Angeles, manufacturers of testing equipment, are pooling their facilities. The two firms will work together on projects where electronic, hydraulic and mechanical know-how are required. "At the outset we expect this work will be largely in manufacturing ground support testing equipment, particularly for aircraft and guided missiles," officials say.

Enlarges Canadian Plant

McQuay-Norris Mfg. Co., St. Louis, producer of automotive and tractor rings, pistons, bearings, pumps and chassis parts, will add about 40 per cent more floor space to its plant in Toronto, Ont. The firm recently opened a Detroit factory branch warehouse.

Convair To Build Test Unit

Convair, a division of General Dynamics Corp., will build a high altitude test facility for aircraft systems, parts and equipment at its Ft. Worth, Tex., plant. Cost: $2 million. The plant has $3.25 million worth of new construction under way.

Crucible Mfg. Corp. Organized

Crucible Mfg. Corp. has been formed as a wholly owned subsidiary of Consolidated Foundries & Mfg. Corp., Chicago. Officers are George W. Myers, president, and Harry R. Gessner, secretary-treasurer. Headquarters are in the Bockl building, Milwaukee. The new firm will operate as branches of Crucible Steel Casting Co., Milwaukee; Crucible Steel Casting Co., Cleveland; Ebaloy Foundries Co., Rockford, Ill.

Wall Colmonoy Forms Unit

Wall Colmonoy Corp., Detroit, formed Wallco Mfg. Division, formerly known as the Furnace Brazing Division. Wallco offers increased facilities for design, development and manufacture of brazed assemblies involving tubular, stamped and machined components, such as those widely used in the automotive and appliance industries. Frank R. Reynolds, vice president, is general manager of the division.

MSA Research Corp. Formed

Mine Safety Appliances Co., Pittsburgh, formed a subsidiary, MSA Research Corp., to consolidate and expand its programs of basic research in chemistry, physics and nuclear energy. John T. Ryan Jr., president of the parent company, is president of the new corporation. E. G. Sanner, MSA vice president and manager of manufacturing, is executive vice president. Dr. C. B. Jackson is vice president and director of research. Principal laboratories of the research firm will be at Callery, Pa.

Orders Heat Treat Furnaces

Cooper Alloy Corp., Hillside, N. J., will install two heat treat furnaces, a water spray quench station and traveling crane manipulator in its Aircraft Products Division, Clark, N. J. Contract for the equipment was awarded to Gas Machinery Co., Cleveland.

Zero Mfg. Completes Expansion

Zero Mfg. Co., Burbank, Calif., completed a $250,000 plant expansion program that increases its production area to 85,000 sq ft. The program includes deep-drawing hydraulic presses.

Sets Up Two New Divisions

Aircraft Products Co., Bridgeport, Pa., established two new divisions. Tactair Valve Division will make high precision valves and specialized hydraulic and pneumatic components for aircraft and general industrial use. Tactair Autopilot Division will make a new line of autopilots for business aircraft.

Will Make Pangborn Equipment

Pangborn Corp., Hagerstown, Md., manufacturer of blast cleaning and dust control equipment, signed a licensing agreement with Hepburn Conveyor Co. Ltd., Wakefield, England, for manufacturing rights of Pangborn equipment.

Hamden Steel & Aluminum Co.

Hamden Smelting Co. Inc., Hamden, Conn., redesignates its warehouse operations as Hamden Steel & Aluminum Co., to be operated as a division. Officers are: Louis Lapides, president; P. D. Wingate, vice president; George Gorman Jr., secretary.

Allegheny-Oberg Expands

Allegheny-Oberg Inc., manufacturer of tungsten carbide and steel dies and parts, moved into a new 10,000-sq-ft plant on Allegheny drive, just off Freeport road, Tarentum, Pa. The facilities are large enough to triple production. Officers are: N. W. Oberg, president; B. L. Doutt, vice president;

E. Frank Hicks, secretary-treasurer.

Yale & Towne Builds in West

Yale & Towne Mfg. Co., New York, is building a $1-million, 100,000-sq-ft lift truck plant in Alameda county, California. Completion is expected early next year.

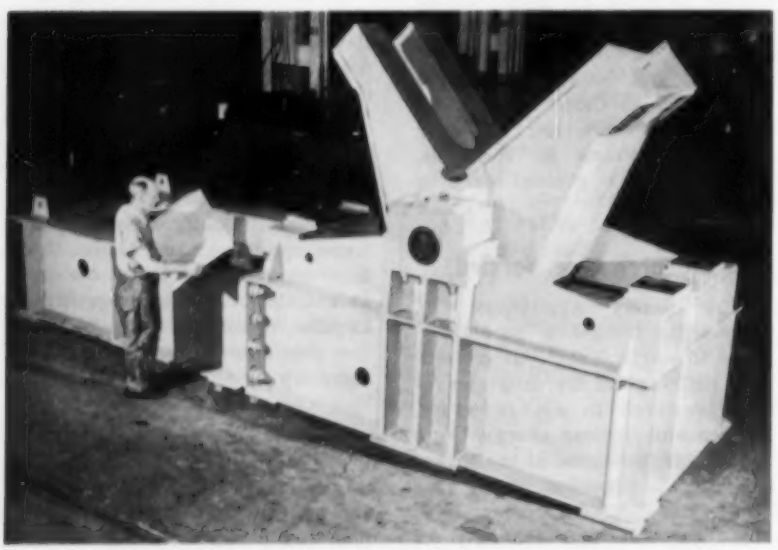
CONSOLIDATIONS

McGraw Electric Co., Elgin, Ill., will merge with **Thomas A. Edison Inc.**, West Orange, N. J., subject to stockholders' approval. The consolidated firm will be known as McGraw-Edison Co. Principal products of McGraw Electric are small home appliances, water heaters, fuses, plugs, transformers and utility goods. Edison's products include instruments, batteries, dictating machines and other sound recording equipment. Max McGraw, president of McGraw Electric Co., will continue as president and chief executive officer of the consolidated company. Charles Edison, chairman of the Edison company, will become chairman of the merged firm; Henry G. Ritter III, president of Edison, will be president and chief executive officer of the Edison company which will operate under a continuation of its present management and name as a division of McGraw-Edison Co.

Revere Copper & Brass Inc., New York, purchased the **Aluminum Foil Container Department** of Wilkinson Mfg. Co., Omaha, Nebr. The division will continue to be operated for Revere by the Wilkinson management. This is part of Revere's multimillion dollar aluminum expansion program. Wilkinson will continue to manufacture refrigeration units, electrohydraulic systems and ammunition components for Army Ordnance.

Sterling Foundry Co., Wellington, O., subsidiary of Warner & Swasey Co., Cleveland, acquired more than 90 per cent of the outstanding shares of **Brown Industries Inc.**, a foundry in Sandusky, O. Brown Industries will be operated as an independent unit under Sterling management.

L. A. Young Spring & Wire Corp., Detroit, purchased **Gonset Co. Inc.**, Burbank, Calif., manufacturer of communications electronic equipment. N. D. Ely, president of L. A. Young, says the firm plans to expand Gonset's product line into broader areas of the electronics field. F. R. Gonset is general manager of the west coast plant which will be known as the Gonset Division.



Steel Coil Tilter Readied for Shipment to Germany

This 45,829-lb tilter for steel coils was fabricated at Link-Belt Co.'s plant at Colmar, Pa. It is designed to upend or downend steel coils weighing as much as 30 tons and measuring 72 in. OD. It will be installed at the end of a two-strand conveyer in Continental Foundry & Machine Co.'s plant at Kloeckner, Germany. The tilter was furnished through Wean Engineering Co., Warren, O.

ASSOCIATIONS

New officers of **Pressed Metal Institute**, Cleveland, are: President, Bruce Krasberg, R. Krasberg & Sons Mfg. Co., Chicago; first vice president, Clint Stryker, Maysteel Products Inc., Milwaukee; second vice president, Carter C. Higgins, Worcester Pressed Steel Co., Worcester, Mass. Bryant Gemmill was re-elected secretary and treasurer; H. A. Daschner, managing director.

NEW ADDRESSES

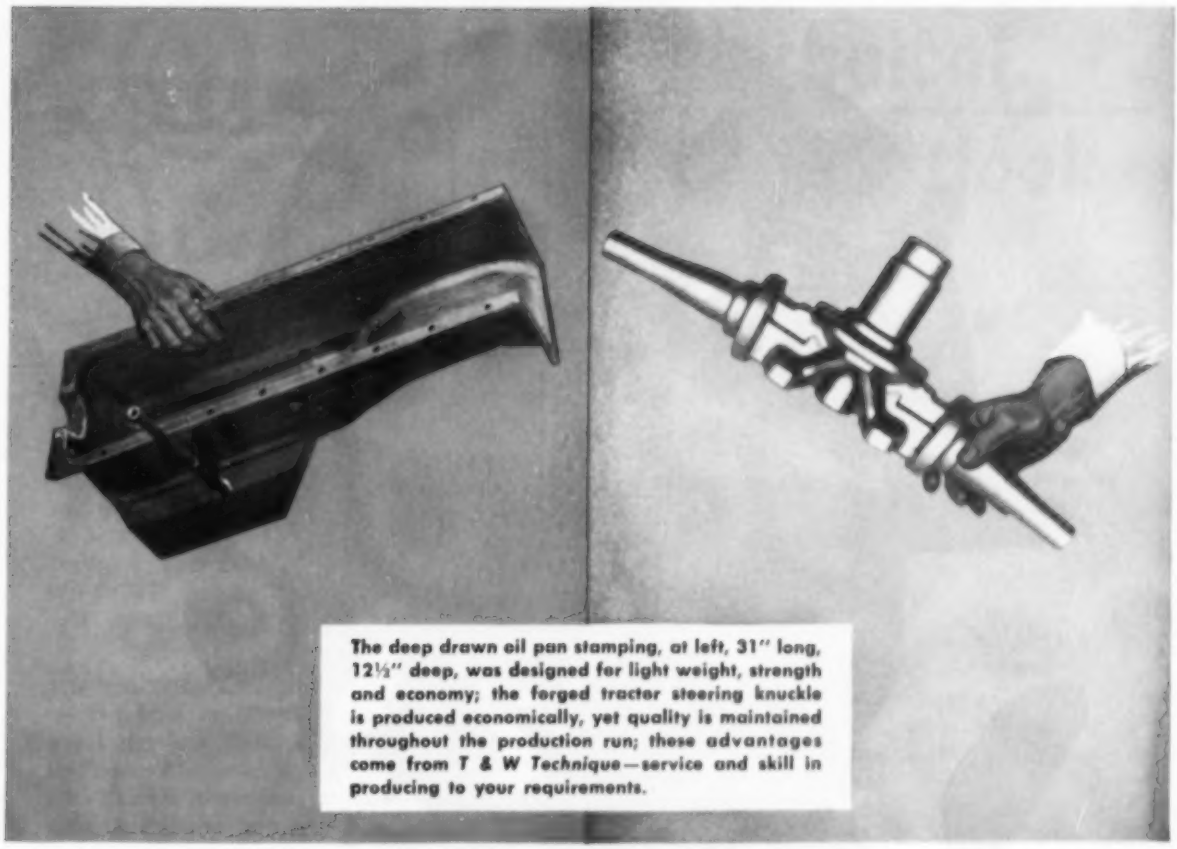
Advance Stamping Co. moved its Detroit plant to new quarters at 12025 Dixie Ave., which have more than twice the floor space of the former plant. A 25 per cent increase in output is made possible.

Arthur G. McKee & Co. transferred its **Steel Division** to a recently completed building on Euclid avenue near East 24th street, Cleveland. The engineering and construction firm maintains its home office and engineering headquarters at 2300 Chester Ave., directly north of the new building.

C. O. Bartlett & Snow Co. moved its Grindle Division from Harvey, Ill., to its main headquarters at 6200 Harvard Ave., Cleveland 5, O. John Donaldson is manager of the division.

Link-Belt Co., Chicago, moved its Cleveland office to larger quarters at 3592 Lee Rd., Cleveland 20, O. J. D. Riley is district manager.

Towmotor Corp., Cleveland, opened a service branch for its industrial lift truck equipment at 6920 Crescent Blvd., Camden, N. J. W. G. Wilhelm is manager.



The deep drawn oil pan stamping, at left, 31" long, 12½" deep, was designed for light weight, strength and economy; the forged tractor steering knuckle is produced economically, yet quality is maintained throughout the production run; these advantages come from *T & W Technique*—service and skill in producing to your requirements.

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Technical Outlook

AUTO DIECASTING— Windows and doors are moving so far into auto roofs that there is serious talk of making the top a one-piece aluminum diecasting. Also in the wind is a diecast aluminum auto wheel. The tire for it will be backed with aluminized fabric permanently bonded to an aluminum rim. The tire and rim will be sold as a unit.

BIG INGOTS— The heavy press program has worked back to the aluminum ingot makers. The latest is a 32-in. forging ingot developed by Kaiser Aluminum & Chemical Corp. for the Air Materiel Command. Both 7075 and 2014 alloy ingots have been poured in the large sizes and worked down to large closed die forgings. In grain size, structure and other qualities, the big ingots resembled smaller commercial ones. Experiments indicated that ingot quality is reflected in the finished forging in spite of wide variations in intermediate treatment.

TREND— The search for cheaper forming methods led Chrysler Corp., Detroit, to radial draw forming, says Cyril Bath Co., Solon, O. Besides trim, drip rails and similar light parts, the formers will be used for door pillars, quarter panel pillars and trunk drain troughs. Many of those parts used to be made on conventional draw dies. The new method releases designers from some of the limitations of conventional methods, gives them new freedom in part design.

METAL SHOW NOTES— High purity columbium (niobium) opens up new possibilities for high temperature alloys and applications in the atomic energy and chemical processing fields, says Kennametal Inc., in announcing volume production of the metal. Another Kennametal product at the show was a platinum-based cemented carbide (K501) developed to stand extremely corrosive conditions. It is said to be equal to the noble metals in corrosion resistance yet lower in cost and more wear resistant. Uses are in seal rings, metering orifices, bushings, nozzles and other parts for corrosive conditions.

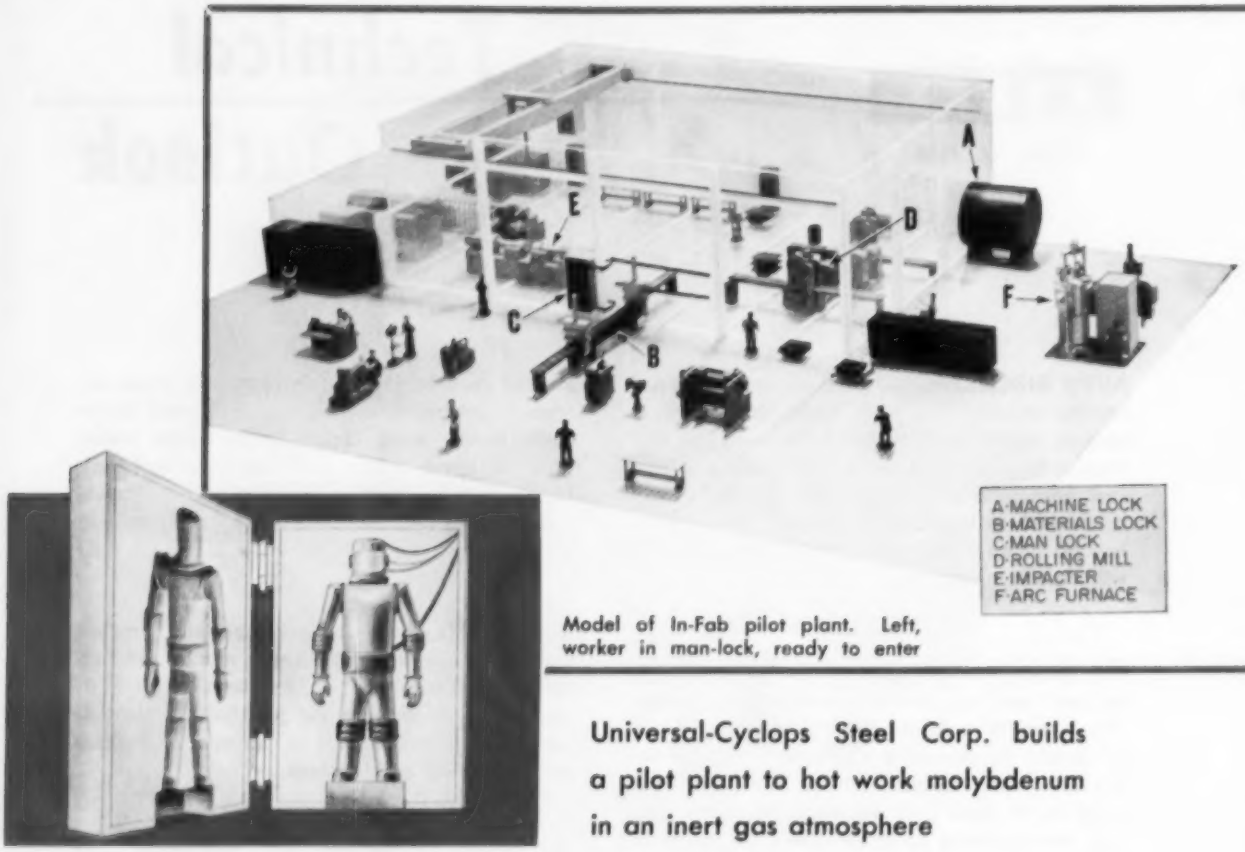
RUMOR— The next time someone tells you that welding speeds over 200 in. per minute are fantastic, show him this: A prominent auto framemaker is attempting a lap joint with a General Electric CO_2 head at 500 in. per minute. STEEL's source says it may succeed.

JET NOISE— Engineers are controlling the roar of jet engines. By the time jet transports go into service, the sound will be muffled to a satisfactory level, says M. M. Miller, acoustical engineer at Douglas Aircraft Co. Inc. It and other companies are working on suppressor devices that point to a solution of the jet noise problem by 1960.

RADIATORS— Some 1957 autos will have stainless steel tanks and baffles in their radiators. McCord Corp., Detroit, says the 410 stainless parts will be used on about 10 per cent of one model. About 2 lb of the noncritical material will be used on the average radiator.

NO PUMPS— Pumpless rectifying systems are about to add $35 million to General Electric Co.'s income. The aluminum industry is snatching them up to power pot lines. Each line has 100 or more pots, with each pot operating 24 hours a day on approximately 6 volts at 100,000 amperes. These rectifiers take less space and require less maintenance than vacuum pump types, says GE. Alcoa, Reynolds, Kaiser and Olin Mathieson will use them.

Metalworking Outlook—p.39 *Market Outlook—p.117*



Model of In-Fab pilot plant. Left, worker in man-lock, ready to enter

Universal-Cyclops Steel Corp. builds a pilot plant to hot work molybdenum in an inert gas atmosphere

The Plant That Outlaws Air

"GAS-TIGHT suit fastened?"

"Helmet secured?"

"Air on? Check for leaks."

"Close the air lock."

Science fiction? Far from it. Such conversation will amount to shop talk in a few months at Bridgeville, Pa.

The occasion will be the entry of the first worker into "In-Fab," an inert atmosphere pilot plant at Universal-Cyclops Steel Corp. The facility has been proposed for the fabrication of molybdenum.

Moly — This metal, which has become the hope and frustration of high temperature engineering, melts above 4700°F. It has tremendous potential for high strength uses at high temperatures, and two tremendous weaknesses: 1. Fast oxidation in the hot work and hot use zone. 2. Embrittlement at "warm" work temperatures (around 2500°F) caused by minute quantities of impurities, primarily oxygen. (See "Molybdenum: Open for Business," page 80).

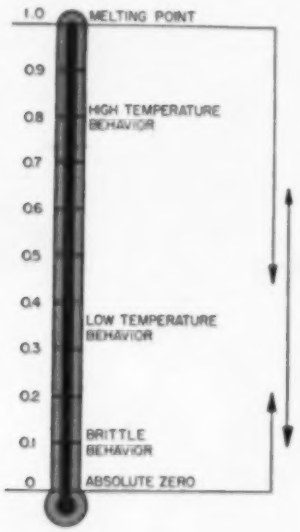
Universal-Cyclops, with the Facilities Branch of the Naval Bureau of Aeronautics, is engineering the pilot plant to get around these difficulties.

How?—The In-Fab (for inert fabrication) plant has been designed to heat and form molybdenum ingots into forged and rolled products at 3500 to 4000°F in a pure, inert atmosphere. This is well into the true hot work zone for molybdenum (six-tenths to nine-tenths of the absolute melting point), where recrystallization occurs during deformation and the metal is ductile and easily deformed.

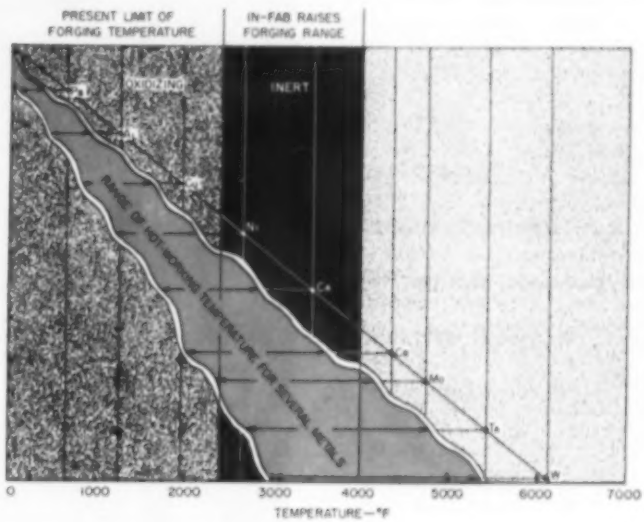
Working temperatures of molybdenum and its alloys have been confined to the cold and warm work zones (up to about 2500°F). Efforts to push working temperatures higher in air have resulted in a situation where the metal becomes hidden in a smoke screen of its own oxidation products and ductility drops sharply.

This warm zone loss in ductility is a serious impediment to fabrication. In-Fab engineers hope to overcome this effect by pushing hot working temperatures up. They also see the possibility of hot working some of the "unworkable" high molybdenum alloys (10 per cent Fe, for instance) that exhibit precipitation hardening characteristics under heat treatment.

In-Fab—The pilot plant will be an airtight enclosure 42 x 100 ft with 25 ft ceiling height inside a 100 x 200 ft building. Inside, a No. 15 Chambersburg Impacter with a semiautomatic manipulator will break down molybdenum ingots to



Homologous temperature scale. In-Fab aims at the upper half



Hot-working temperatures. With oxygen out of the picture, the practical working limit is raised by 1500°F

billets or sheet bars. Ingots up to 10 in. in diameter will be heated below the Impacter in an induction furnace and raised into the forging zone.

Another major piece of fabricating equipment will be a miniature 16 in. Birdsboro blooming mill. It will be equipped with flat and grooved rolls, and driven rolls for manipulating the work. Billets and sheet bars for rolling will be heated within graphite muffles by indirect induction in an Inductotherm furnace.

Typical metalworking tools such as a lathe, hacksaw, shear, drill press and welding equipment will also be inside the room.

Atmosphere—The room will be filled with an inert gas maintained at 1 ounce above atmospheric pressure. To drive out the air, the plan is to blow up balloons inside the room until they fill most of the space, and then to puncture them. A gettering system and inert gas tanks will purify and maintain the atmosphere at a 99.98 per cent or higher inert gas level.

The room will have three air locks, one for equipment, one for supplies and one for personnel. The first two will be conventional tunnel structures with gas tight doors at either end, and pumping equipment to exhaust the air. The man-lock, which will be used more often, will consist of two doors, lined with diaphragms or spongy material that will conform closely to the shape of a man's body. Since these will exclude most of the air in the lock, it will be unnecessary to pump it down.

The workers will wear air-cooled "space suits." Inside the plant they will hook up air lines to intake and exhaust manifolds. In case of hose breakage, an auxiliary air supply in the suit will be sufficient to see a man safely out of the plant.

Background — Universal-Cyclops and the Navy would never have embarked on this Buck Rogers venture without a reasonable conviction that it would work. Back of it is a series of experiments.

About two years ago, engineers in the General Electric Co. Research Laboratories constructed an argon atmosphere box around a forging hammer and heating unit. The operator manipulated work in the forge from the outside, reaching into the box through rubber glove ports. The experiment demonstrated the hot forgeability of several materials that could not be forged successfully in air.

Climax Molybdenum Co. laboratories in Detroit went a step farther. They built a tent around the forge, filled it with argon atmosphere and put a worker inside. The experiment proved that it would be possible for men to work under such conditions.

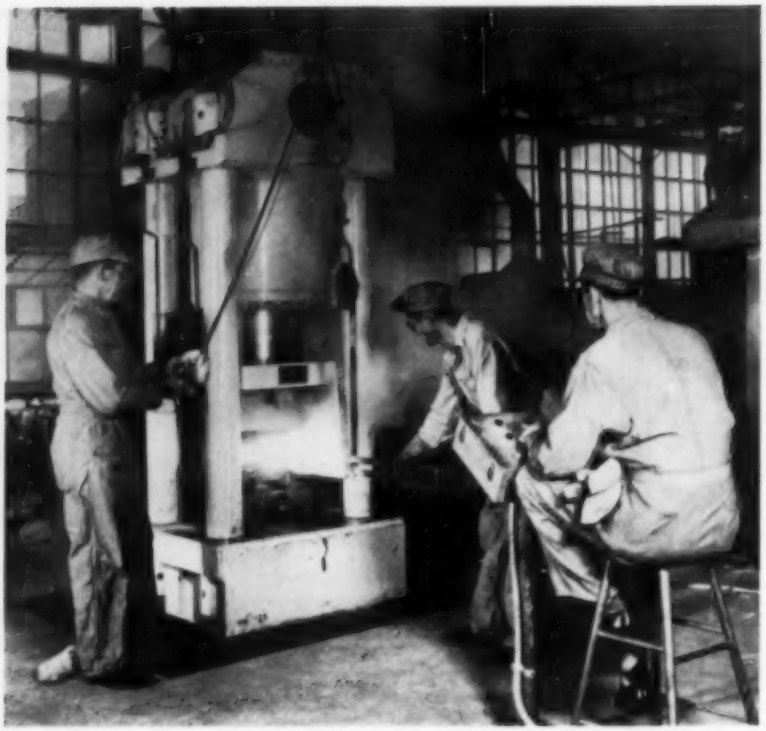
At Battelle Memorial Institute, Columbus, O., a rolling mill experiment, similar to the GE one with the forge, is operating under Universal-Cyclops' sponsorship. The Atomic Energy Commission has similar facilities.

Ingots — Universal-Cyclops will produce its own molybdenum ingots. The process will start with compacted discs of molybdenum powder which will be sintered and fused together into a column under vacuum. The column will be arc cast into an ingot in a GE vacuum arc furnace in a corner of the same building housing the In-Fab enclosure.

The arc casting furnace is already in place. Details, such as the final design of the protective suits, are still being worked out, but the plant should be operating within a year.

** An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

After ten years of intensive research, molybdenum stands ready to fulfill its promise as a high-temperature structural material



Oxidation is the big problem in molybdenum working as well as high-temperature use. Billet being hot forged is hidden in vapor from its own oxidation

Molybdenum: Open for Business

ON Sept. 17, several hundred engineers and scientists met at a symposium in Detroit to talk about one subject: Molybdenum. The date is a milestone. Looking back, we will remember that it marked the period when molybdenum began to realize its high temperature engineering promise.

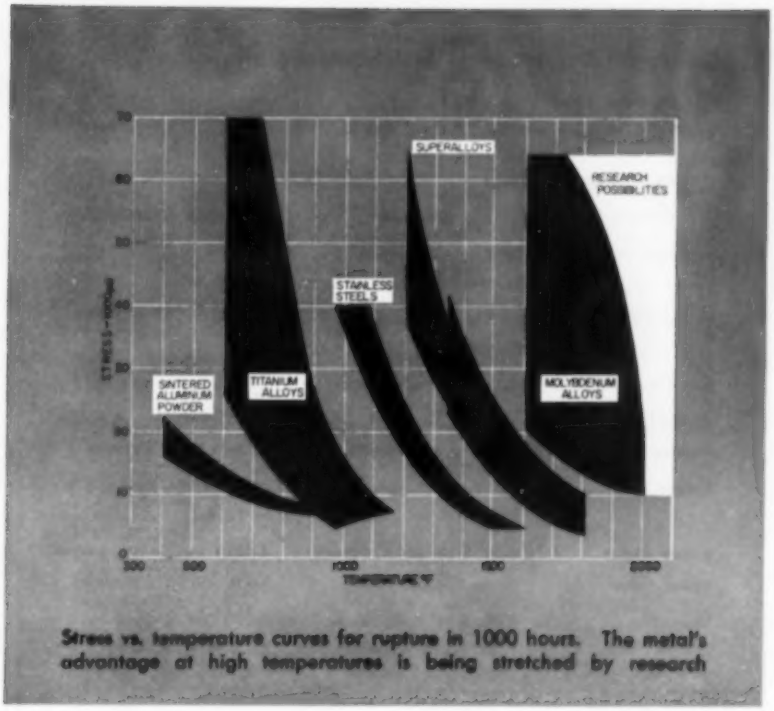
Ten years ago, the limitations of the classic alloys were beginning to be widely accepted, but the way to better high temperature materials was far from clear. If we took the tungsten road, we paid for a high melting point with high density and poor ductility. If we took the chromium road, we solved the oxidation problem but got brittleness instead. If we took the nickel - iron - cobalt road, we got ductility but sacrificed the refractoriness we were trying to achieve.

Compromise — Molybdenum seemed a likely choice, though it conceded something to all three: It melts at a lower point than tungsten, is less ductile than iron alloys and oxidizes itself to pieces at temperatures above 1000°F. Still, it seemed more feasible ten years ago to try to solve molybdenum's oxidation problems than to correct the weaknesses of the other materials. In the intervening years, they have not been neglected, but moly has received the big push.

The symposium, sponsored by the Office of Naval Research, was a progress report on how far we have come.

Box Score—We have not reached the objective, but we are getting close:

1. Ingot weight has been increased approximately 100 times.
2. Section size of wrought products has been increased 50 times.
3. Uniformity and ductility of wrought molybdenum have been improved.
4. Alloys which have 100-hour life in stress rupture tests at 2000°F under a 50,000 psi load have been produced.
5. Methods for fabricating and forming heavy sections have been improved.
6. Many coatings which have been designed to provide oxidation resistance have been examined. None pass all the tests that simulate service conditions, but several will provide protection at 2000°F for 500 hours.
7. Molybdenum wrought products are available for production use.



Stress vs. temperature curves for rupture in 1000 hours. The metal's advantage at high temperatures is being stretched by research

Engines—So much emphasis has been put on the military aspects of molybdenum (rocket engine parts, aircraft turbine blades and guide vanes) that the civilian applications tend to be obscured. Until recently, heating elements and electronic parts were the big wrought moly customers. Now the automobile turbine engine, for one, is sure to gain through military centered research.

Military and civilian designers, however, will not be satisfied simply with a material that is stable at 2000°F, a temperature that would markedly increase turbine thrust and efficiency. We must be able to produce it consistently and in quantity at a reasonable price.

Production—The efforts being made to turn molybdenum powder into wrought products are nothing short of spectacular (see "The Plant That Outlaws Air," page 78). Ingots 9 in. in diameter are being produced by powder metallurgy techniques, followed by a second step, arc casting. At least four alloys are commercially available in a considerable range of forms (see chart, page 82).

Ingots are melted and cast in vacuum appear to have the edge over sintered bars as a starting point for wrought products because of their lower oxygen content. Cast ingots with an oxygen content of less than 0.005 per cent can be regularly produced by using a high-purity molybdenum powder and adding graphite so that the total carbon in the charge is equivalent to the total oxygen on the basis of CO as a deoxidation product.

Ingot-producing equipment is evolving fast. Ingots are being made from powder wafers compacted in air, sintered into an electrode in a hydrogen atmosphere and melted in a consumable electrode furnace under inert atmosphere. At the other extreme is a Climax Molybdenum unit that continuously forms an electrode from powder and arc melts and casts it with the entire sequence carried out under vacuum. Nonconsumable electrode furnaces are also in the picture.

Working—The art of hot working molybdenum has lagged, although several experiments climaxed by the Universal-Cyclops' In-Fab pilot plant show the direction in which it is moving (see page 78). Approximately 2500°F has represented the upper limit for working temperatures (moly begins to oxidize rapidly above 1200°F). This would be hot work for steel, but for moly, melting around 4750°F, it is virtually cold work.

The push now is to find ways of working molybdenum in its true hot work range, between six-

Molybdenum Today and Tomorrow

ESTABLISHED USES	POTENTIAL USES
Incandescent lamp filament supports	Jet engine turbine buckets
Resistance furnace heating elements	Jet engine turbine nozzles
Electrical contacts	Rocket and ram jet nozzles, leading edges, flame gutters
Electronic tube grids	Aircraft sheet metal structures subject to high heat
Heat treating boats	Glass molds
Lamp filament winding mandrels	Molten glass pumps
Glass tank electrodes	Molten metal pumps
Glass tank stirrers	Die-casting machine parts for brass and other high-melting-point alloys
Thermocouple protection tubes	Hot extrusion dies
Metallizing wire for shaft build-up	Cutting tools
Metallizing wire for wear resistance on dies, pulleys, mandrels	Heat exchangers, piping, corrosion resistant and structural parts in chemical and nuclear energy fields
High temperature furnace radiation shields	Aircraft and missile honeycomb structures, guide vanes, skins and nose cones
Furnace skid tracks	High-temperature engine parts
Billet piercer points for stainless seamless tubing	
Electrode tips for electrobrazing	
High-rigidity boring bars	
Power tube cathodes	
Bimetal fire detectors	

tenths and nine-tenths of its melting point (2850 to 4250°F). At such temperatures molybdenum is easily deformed. Below them, it resists deformation and embrittles quickly.

Alloys—The present moly alloys, containing less than 2 per cent of alloying elements like titanium, vanadium or tungsten, are scarcely alloys at all in the usual sense. One of the hopes of the hot work effort is to find ways of working higher alloys that can acquire exceptional properties through heat treatment.

Another of the hopes is to find better ways to work the metal in the range represented by one-half the melting point (about 2400°F) where present materials show a sudden increase in embrittlement. Lower oxygen content appears to be part of the answer here.

Fabrication — Welding research has been keeping up with the molybdenum parade and has some advice ready for fabricators. It boils down to: Keep oxygen and nitrogen out; use deoxidized material.

For sound welds of maximum ductility, the welding atmosphere must contain not over 0.005 per cent oxygen, and shielding gas (argon) must be at a level to prevent nitrogen from entering the weld metal. Although shielded arc welding has been done in air, uniform results are hard to achieve. The preferred procedure is to weld in an airtight cabinet containing an inert atmosphere.

Coatings — The efforts to find coatings that will protect molybdenum from oxidation have been tremendous. Cladding, spraying, electroplating, vapor deposition, dipping and chemical conversion have been tried. Success is still around the corner.

A successful coating for turbine blades must exhibit exceptional properties. Among them:

1. Oxidation resistance at 1800 to 2000°F for at least 100 hours.
2. Thermal shock resistance and a low coefficient of expansion between the coating and base material.
3. Impact resistance to take the blows of small particles drawn into the turbine.
4. Erosion resistance to combat the wearing action of hot gases and abrasive dust and metal particles.
5. Fatigue resistance to withstand the strains of high centrifugal (and other) forces.
6. Ease of application below the recrystallization temperature of molybdenum.
7. Smoothness to impart good aerodynamic qualities.
8. Chemical stability with the base alloy.

Electroplated chromium and nickel layers appear to be the best bet now. Cladding has a good chance to become important for simple shapes if the clad metal can be successfully fused at the edges. Sprayed coatings of complex nature may be applicable in the 2000 to 2400°F range. For higher temperatures, only ceramic and silicide coatings seem to hold much promise.

Invitation — The symposium made another point emphatic: Research has reached the place where service evaluation is needed to round out the picture. Users are wanted.

Only about one-third of the available melting capacity is being utilized. Molybdenum products are available.

The era of molybdenum, the high temperature structural material, has begun.

Commercially Available Molybdenum

Standard alloys

Unalloyed, 0.3 per cent CB, 0.5 per cent Ti, 1.0 per cent V, 2.0 per cent W

Approximate size range

FORM	ARC CAST	POWDER METALLURGY
Machined ingots	To 8½-in. diameter To 800 lb	To 36 sq in. To 500 lb
Extruded bars	To 5¾-in. diameter To 300 lb	———
Rolled bars	½ to 3½-in. diameter To 250 lb	1 to 2 in. diameter To 30 lb
Swaged bars	⅛ to ⅝-in. diameter	⅛ to 1¼-in. diameter
Ground bars	0.030 to 3 in. diameter To 100 lb	0.030 to 1¼-in. diameter To 25 lb
Drawn wire	0.0015 to ¼-in. diameter	0.0015 to ¼-in. diameter
Heavy plate	⅛ to 1¼-in. thick	⅛ to 1¼-in. thick
Sheet	0.0005 to ¼-in. thick 1/16 to 36 in. wide	0.0005 to ¼-in. thick 1/16 to 16 in. wide

The search for a good high-temperature coating for molybdenum goes on unabated. In this testing device, coated strips are repeatedly heated to 1800°F and cooled to room temperature by blasts of compressed air

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Two Nodular Iron Foundry Heats Produced in a 36-in. Basic Cupola

Cupola Charge (lb)	Heat 1179-A	Heat 1179-D	Nodulizing Additions (% of metal treated)
Pig iron	350	—	0.4% NaCl
Nodular iron scrap	300	—	0.8% $MgCl_2$
Steel	350	1000	1.8% CaSi
Silicon briquets (2 lb of Si per briquet)	8	20	FeSi Added to Ladle
Coke	150	175	
Limestone	50	45	8 lb per ton in each heat
Fluorspar	20	15	
Calcium carbide	10	10	

Chemical Analysis	Heat 1179-A (before nodulizing)	Heat 1179-D (before nodulizing)	Heat 1179-A (after nodulizing)	Heat 1179-D (after nodulizing)
Total carbon	4.61	4.10	3.34	3.39
Sulphur	0.017	0.03	0.009	0.009
Manganese	0.42	0.58	0.44	0.58
Phosphorus	0.052	0.05	0.050	0.050
Silicon	1.22	1.22	2.90	2.97
Magnesium	—	—	0.023	0.026

Mechanical Properties	Heat 1179-A (before nodulizing)	Heat 1179-D (before nodulizing)	Heat 1179-A (after nodulizing)	Heat 1179-D (after nodulizing)
Tensile strength	13,150	16,300	79,500	84,400
Yield point	—	—	60,000	64,000
Elongation in 2 in.	—	1.0	19.5	12.5
Brinnel hardness	121	137	187	197

New Process for Making Nodular Iron

Adding sodium and magnesium chlorides to molten iron with calcium silicide as a reducing agent produces an easily machinable and ductile iron without annealing

THE TABLE above tells the story of a new nodular iron process. It's an analysis of two foundry heats produced in a 36-in. basic cupola at Allis-Chalmers Mfg. Co., Milwaukee.

The company produces easily machinable and ductile nodular iron without annealing, and without introducing other elements with the nodulizing agent, Harry K. Ihrig, vice president in charge of research, reported at an American Society for Metals session during the Metal Show.

Practice—The magnesium process is the most used commercially. Magnesium is a difficult metal to add to molten iron because of its high vapor pressure at that temperature. It reacts violently.

For this reason, magnesium is added in the form of dilute alloys, such as those of nickel, copper and others. The alloys increase the cost of the nodulizing agent; they also stay in the final product, and sometimes are undesirable, said Dr. Ihrig.

New Method—In the new process, instead of using active metals such as sodium or magnesium as nodulizing agents, the halides of these metals and a reducing agent are added to the molten iron.

The least expensive reducing element is calcium. When used in the form of calcium silicide containing about 30 per cent calcium, it may be added to the molten iron without a violent reaction.

Action—The chloride is the preferred halide to be used as a nodulizing agent. When it is reduced to the metal, the active nodulizing element is formed in

atomic fineness and is absorbed immediately in the molten bath.

In contrast, solid magnesium does not disperse, but forms a reactive vapor at such temperatures. Even if the metal is finely ground or powdered, it still is many times larger than the atoms of metal formed by reduction of the halides.

Charge — There has been no violent reaction even when a large ladle of iron is poured directly on a large quantity of the nodulizing and reducing agents. Both electric furnace and cupola irons of low sulphur content have been used successfully. Even all-steel scrap charges may be used.

All the halides of nodulizing metals have been successful experimentally, but the chlorides are the cheapest and are being used commercially. Mixtures of sodium and magnesium chlorides with calcium silicide as the reducing agent give the best commercial results.

Experiments — It has been reported that calcium alone or calcium silicide will not produce nodular iron unless 50 per cent or more nickel is present. The calcium in the calcium silicide used with the halides is primarily a reducing agent which frees the nodulizing element.

During experimental work, chlorides of sodium, magnesium, lithium, strontium, barium, rubidium and cerium (misch metal) were reduced with calcium silicon to nodulize low sulphur iron. The molten base iron was poured on a mixture of calcium silicon (30 per cent calcium) and the halides.

After the reaction, the slag was skimmed off, and the molten metal was poured into molds. Analyses of the base iron were made. The sodium and magnesium chlorides give the best nodular structures.

Proved—The process was proved by several months of commercial operation in the foundry. Typical commercial heats melted in a 36-in. basic lined cupola were charged with either straight pig iron, mixtures of pig iron and nodular iron scrap or straight steel scrap.

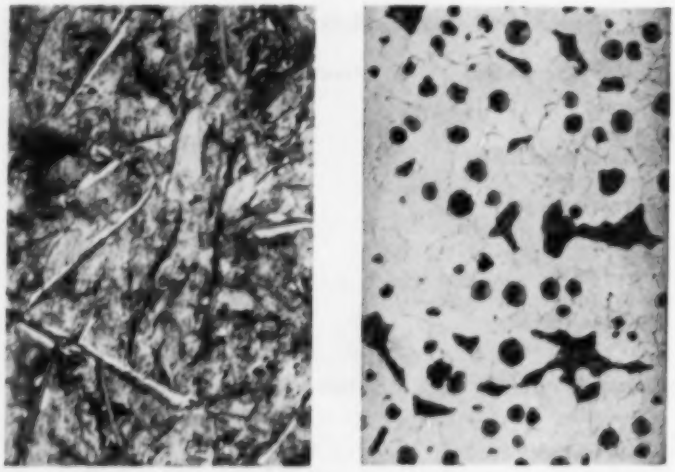
The table on page 83 gives the charging details, analyses and mechanical properties before and after nodularizing. The photomicrographs on this page show the microstructures of the two heats.

Properties—The as-cast nodular irons have consistently high strength and ductility. They can be flame hardened or solution heat treated. They seldom show less than 10 per cent elongation in 2 in.

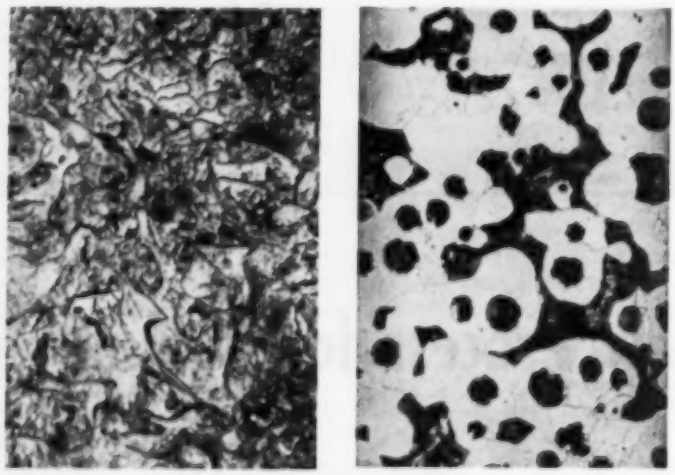
The residual magnesium content is low. In every case, it was below 0.03 per cent; complete nodulizing has been accomplished with as little as 0.015 per cent.

About 1400 tons of castings, varying in size from a few pounds to over 5 tons were cast so successfully that a 54-in. basic lined cupola with a melting rate of 10 tons an hour was put in service the first of this year. About 5500 tons of castings (biggest, 8 tons) have been poured from the larger cupola.

Allis-Chalmers will license the process. Details of the plan are being worked out.



Heat 1179-A. Basic cupola heat with pig iron, return scrap and steel scrap nodulized with mixture of sodium and magnesium chlorides and calcium silicide. Left: Sample taken at cupola spout. Right: After nodulizing. Magnification X100. Etch: Nital



Heat 1179-B. Basic cupola heat with 100 per cent steel scrap. Nodulized with mixture of sodium and magnesium chlorides and calcium silicide. Left: Sample taken at cupola spout. Right: After nodulizing. Magnification X100. Etch: Nital

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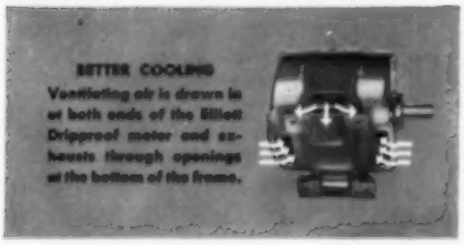
Inside and Outside . . . entirely new

DRIPPROOF TYPE FRAMES 182-326U

the NEW Elliott C-W Dripproof Motor

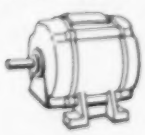
BALANCED DESIGN assures dependable performance


BETTER COOLING
Ventilating air is drawn in at both ends of the Elliott Dripproof motor and exhausts through openings at the bottom of the frame.

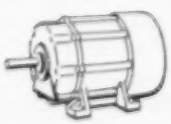
The *balanced* design of the new Elliott C-W type N motors provides the *best* in mechanical protection, the *best* in insulation, the *best* in bearings, the *best* in rigid construction. These motors produce more horsepower per pound, require less space, less maintenance, have longer service life. Every rotor is dynamically balanced. Rigid cast frames assure correct alignment, resist corrosion and mechanical abuse. Highly effective cooling eliminates troublesome hot spots.

The design illustrated above is dripproof—and virtually splash-proof as well. Yet ingenious design has provided ample passages for cooling air. Other types of enclosures providing even greater protection are available for service where conditions are extremely severe.

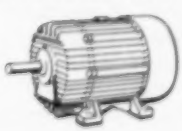
OTHER C-W TYPE N MOTOR ENCLOSURES



Totally-enclosed non-ventilated



Totally-enclosed, fan-cooled Frames 256 U and smaller



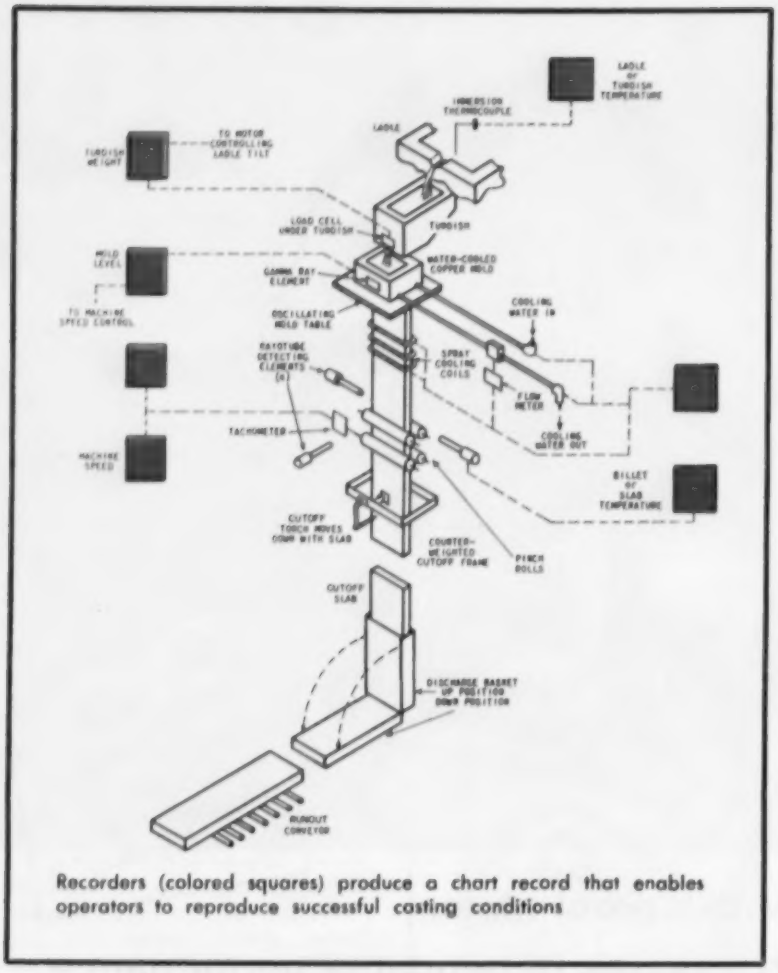
Totally-enclosed, fan-cooled Frames 284U-326U

ELLIOTT Company

CROCKER-WHEELER DIVISION

For complete details, send for new booklet. *WRITE* Elliott Company, Crocker-Wheeler Division, Jeannette, Pa.

W6-5



Recorders (colored squares) produce a chart record that enables operators to reproduce successful casting conditions

Electronic recorders lead way to better . . .

Continuous Casting

SUCCESS in producing continuously cast steel depends on precise control and near-perfect synchronization.

That's what engineers at Atlas Steels Ltd., Welland, Ont., found out when they broke in their new equipment nearly two years ago. Here are some of the variables they had to govern:

1. Molten and solid metal temperatures.
2. The levels of molten metal in tundish and mold.
3. Machine speed.
4. Temperature and flow of cooling water.

Electronics — To overcome the multitude of operating conditions needed to produce different grades of steel, Atlas engineers decided on automatic recorders. By using the charts from previous runs, operators reproduce conditions needed for successful production.

The diagram (above) shows the instrumentation. Beginning with the molten metal in the ladle, instruments measure molten metal temperatures in ladle, tundish and mold; they control ladle tilt by weighing the metal in the tundish; and they regulate the machine speed to maintain a constant metal level in the tundish. Measurements are made of spray inlet and outlet temperatures and cooling water temperature; flow is also measured and controlled. Surface temperatures of the slab are recorded automatically, as is machine speed.

Molten Temperatures — A high velocity burner keeps the metal in the ladle between 2750 and 2850°F. When the ladle arrives, the operator checks its temperature with a Leeds & Northrup immersion thermocouple connected to a panel mounted recorder. Signal lights tell the operator whether he has made a correct measurement and when it is complete. He marks the heat number on a chart opposite the temperature record.

The operator also uses the immersion couple to check temperature in the tundish and for an occasional check of the mold metal.

A Baldwin SR-4 load cell mounted under the tundish can be used to weigh the amount of molten metal in it. It's an indirect measure of the metal level in the reservoir, and controls the ladle tilt. When on "automatic," the control holds a constant head of molten steel in the tundish regardless of varying machine speeds.

At present, operators control ladle tilt manually.

Mold Level—Machine speed depends on the amount of metal in the mold. An automatic, gamma-ray type instrument (connected to a recorder-controller) has been successful experimentally in regulating machine speed. This speeds up the machine as the level of molten steel rises and slows it down as the level falls. The variation is slight because the supply of molten metal from the tundish is constant.

The molten metal is partially frozen into a thin shell for the casting by the water-cooled mold. Synchronized with machine speed, it oscillates to keep the shell free as the metal moves through the mold. Cooling water flow is critical at this point.

Thermocouples measure both inlet and outlet cooling water temperatures. A flow meter measures the rate. Both thermocouples and flow meters are connected to a

(*Please turn to page* 89)

We've doubled our capacity for SILICO-MANGANESE

One of the new silicomanganese furnaces at our Philo, Ohio plant.

Ohio Ferro-Alloys has been a continuous producer of silicomanganese since 1952. To assure an ample supply for the future needs of the iron and steel industry, new facilities which double previous capacity are now in operation at our Philo, Ohio plant.

Recommended as an effective and economical deoxidizer, silicomanganese will save you furnace time and produce cleaner steel. Ohio Ferro-Alloys' silicomanganese is available in three carbon grades. Each is properly sized for either furnace or ladle additions to meet your requirements.

Ohio Ferro Products

- FERRO - SILICON 25 - 50 - 65 - 75 - 85 - 90%
- SPECIAL BLOCKING 50% FERRO - SILICON
- SILICON METAL
- HIGH CARBON FERRO-CHROME
- LOW CARBON FERROCHROME
- LOW CARBON FERRO-CHROME SILICON
- FERRO - MANGANESE
- SILICO-MANGANESE
- MED. CARBON FERRO-MANGANESE
- BOROSIL
- SIMANAL
- RARE EARTH ALLOYS

Briquets

- SILICON
- MANGANESE
- CHROME
- SILICO-MANGANESE

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Chicago Detroit Pittsburgh Tacoma Seattle Denver
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Columbium

by MCA

permits design engineers and metallurgists new latitude, the wide-open throttle

Alert design engineers may once more avail themselves of the special properties of columbium without fear of inadequate supplies. Severe requirements for highly stressed parts (such as turbine blading and exhaust manifolds) demand the best material, not near-substitutes.

The future promises more exacting demands, and engineers have been quick to recognize the help they can get from columbium to enhance high-temperature strength and corrosion-resistance.

MCA, in manufacturing columbium products, pledges the same high quality and uniformity that has distinguished MCA tungsten, molybdenum, boron and rare earth alloys and chemicals . . . to meet fully your specifications, with the usual excellent service and delivery. Write today.

MOLYBDENUM

Grant Building CORPORATION OF AMERICA **Pittsburgh 19, Pa.**

Offices: Pittsburgh, Chicago, Los Angeles, New York, San Francisco
Sales Representatives: Brumley-Donaldson Co., Los Angeles, San Francisco
Subsidiary: Cleveland-Tungsten, Inc., Cleveland
Plants: Washington, Pa., York, Pa.

MCA

recorder so the operator can check mold cooling water conditions.

Below the mold, water sprays cool the casting as it moves down toward the pinch rolls. Complete and uniform cooling is essential.

Thermocouples measure both inlet and outlet spray water temperatures and record them on the same instrument used for mold coolant temperature and flow rate.

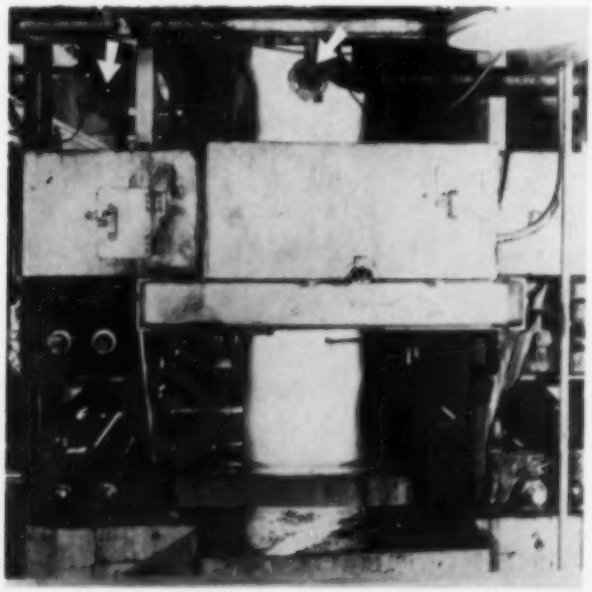
Surface Temperatures — Below the spray cooling chamber, detecting elements on the four sides of the slab measure temperatures which have dropped to about 1600°F. They are logged on a high-speed recorder.

By now, the casting must be completely solidified. Above this point, molten metal inside the casting shell is in the shape of an inverted cone with its point or apex at the center of the slab. Surface temperatures indicate whether the slab has been uniformly cooled.

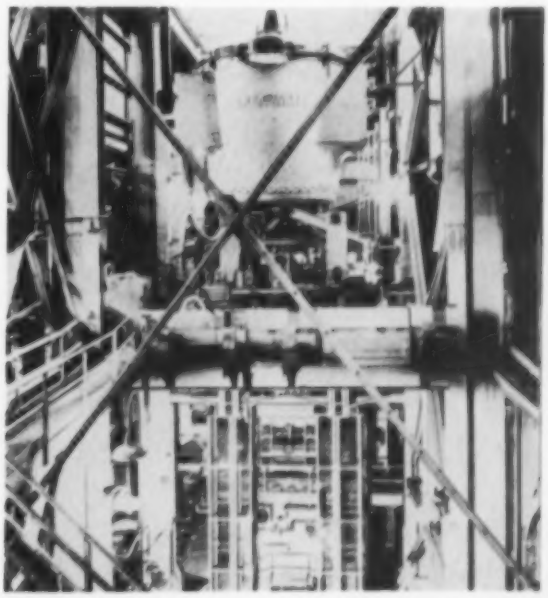
Atlas Steel likes the radiation type instrument. It responds quickly to temperature changes in the moving slab.

Machine speed is no problem. A tachometer-generator geared to the pinch rolls, a recorder and a dial shows in inches per minute the machine speed for each run.

Part of the operating panel. Chart recorders are labeled; one at far right is for mold and spray cooling water



Here are two of the four L&N Rayotube detectors (arrows) which measure the critical surface temperatures of slabs and billets



Atlas Steels' continuous casting machine has four levels. Tundish is at the top. Operating floor is 31 ft above the ground

THE SHOT OF LEAD THAT STARTED A REVOLUTION!

SECRET OF INLAND PATENTED LEDLOY® PROCESS is this precisely controlled "shot" of lead pellets gunned into molten steel as the ingot is poured.

Leaded steels are re-writing the book on machinability. They go by a variety of trade names . . . but all are made by the patented Ledloy* process developed by Inland Steel.

In 1939, Inland metallurgists working with others engaged in the field of free-machining steel research, developed a new steel that behaved like brass under a cutting tool, yet it had the strength and other properties of high quality open hearth steel.

The secret lies in the method of dispersing an almost infinitesimal amount of lead particles (less than ¼ of 1%) throughout the molten ingot as it is poured. Dispersal is so uniform there is no alteration of the steel's basic qualities. Yet this tiny "shot" of lead does amazing things to the steel's machinability. As Ledloy has become more generally available, one case history after another has documented the production increases and lowered costs it makes possible.

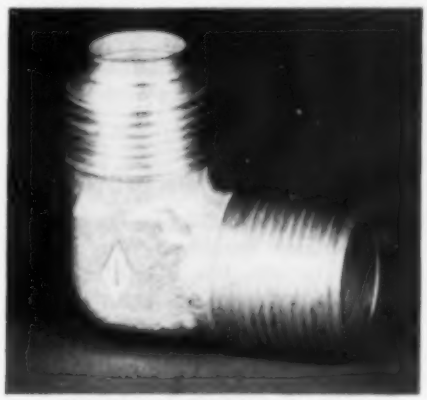
Leaded steels are now made under Inland licenses by a number of manufacturers. But whether the leaded steel you use is called Ledloy or any other trade name, it is made by the patented, closely controlled process that makes the Ledloy family truly the "world's most machinable steels".

Ledloy gives the ultimate performance for which your modern machines were designed.

The fact that Ledloy can be machined at extremely high speeds (up to 45% faster than B-1113 in some cases) is only one reason for its increased productivity. The lead particles in Ledloy actually lubricate the cutting tool during machining. Also Ledloy chips break up into shorter lengths which quickly fall free of the tool, again reducing heat and friction.

Result: greatly increased tool life and less down-time. Production increases of 50% or more are not unusual, yet qualities of open hearth steel are retained.

REJECTS PRACTICALLY ELIMINATED on this heat control element when Ledloy replaced non-leaded steels. Machining speed increased 42.5%, tool life was prolonged with drop in machine down-time.



MACHINABILITY STEPPED-UP 27% on this forged fitting when manufacturer switched to hot rolled Ledloy Grade A. Just one of many phenomenal case stories reported by producers of machined forgings.

15,000 HOLES must be drilled in this steam condenser baffle plate. Changing from non-leaded steel to Ledloy cut drill and ream time, resulted in truer, smoother holes, with no sacrifice in strength or other properties.

If you make screw machine products or machined forgings, or if your product requires drilling or machining it will pay you to get all the facts about Ledloy. Ask your cold drawer or jobber. Or write for our interesting booklet on "Properties of Leaded Steels".

**registered trade name of Inland Steel Company, leaders in the development of leaded steels.*

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Advice on Buying Foreign Tools

Machine tool imports must be concentrated on types not built here, says this importer. He sees a good continuing market, particularly for hand-crafted precision

IN THE opinion of G. F. Kullack, the day of imported standard machine tools is past. President of M.B.I. Export & Import Ltd., New York, he says "we can only justify importing unique machines."

American builders, he feels, are quick to take on high-production equipment and the multiple purpose standards. But there are some machines they can't afford to market.

Case in Point—The Swiss-built Dixi horizontal jig borer (with precision that would fascinate a watchmaker) sells for about $35,000. Built in this country, it would have to go for nearly $100,000, he estimates. Hand workmanship is the big cost booster.

"We're happy to sell 50 of these machines a year," he says. "At that pace, it pays to import." But, he points out, if the market soared, American builders, with their production techniques, would get interested and perhaps turn out a similar machine.

"It's not that they can't work to these standards. On a machine with limited demand, they don't care to."

Bright Future—Because there's always a market for the unique machine or tool, Mr. Kullack feels the machine tool importing business is on solid ground. "Actually," he says, "the big thing that's holding us back now is that many production men don't know what our machines will do."

The company had its biggest year in 1953 when it sold some $2.5 million worth of machines. This year, business should be about $2 million.

Service and spare parts, the importers' constant challenge, are in good shape, he feels. "A jib bore was dropped off a truck as it was being unloaded at Ford in Detroit. The fall broke a casting. That was Monday.

"We flew in a casting and serviceman from the factory. They got there on Saturday. This kind of service is a must. We can't afford to give less."

Mr. Kullack started his importing business in 1948 when customers of his Machinery Builders Inc. wanted to know where they could get the machine to do the jobs he'd tooled up for them.

In addition to the home office in New York, he has a direct sales office and 15 dealers in other cities. Four full-time servicemen work out of the home office. Foreign builders send servicemen here on rotation. The company that makes the Dixi, for example, keeps two or three men here all the time, changing crews a couple of times a year.

Tooling: Hand in Glove

Ceramic tools are here to stay, but so are carbides. The new won't replace the old—a claim ceramic tool makers have made from the start.

To prove it, the Metallurgical Products Department of General Electric (it used to be Carboloy) put the two materials to work at the National Metal Exposition in Cleveland.

On a Warner & Swasey No. 5 turret lathe, demonstrators faced the end of a 12-in. OD log of 6145 steel, hardened to about 200 Bhn. Doing it the hard way deliberately, they started at dead center (zero surface speed) with grade 370 carbide and took a 1/16 in. deep cut out to a point where the speed was about 600 sfpm. Then they finished the cut with a cemented oxide tool. Speed at the end was about 2700 sfpm.

The point: Ceramics couldn't have tackled the low-speed job; carbides would fail in the high range.

Modular Presses

Standard units can be combined to make a multiple installation. Change-over is simplified

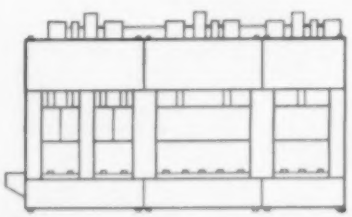
"YOU don't have to worry about a new press becoming obsolete in a few years," is the claim Clearing Machine Corp., Chicago, makes for its Transflex equipment. The division of U. S. Industries Inc. says its presses are being made in modular units for ease in change, rearrangement or combination with later developments in press design.

Example — The press which makes washer and dryer tops for General Electric Co., Schenectady, N. Y., is a combination of several modules or units. As the drawing shows, the installation has twin drives, two crowns and two beds sharing common uprights.

The installation is 58 ft long, has a transfer feed stroke of 50 in. and makes tops at a 700 per hour clip. The design helps integrate production; washer tops are made for 4 hours, dryer tops for the other 4. Only 10 minutes are required for change-over.

Slides—Split-side construction of the first two stations is responsible for the fast change-over. Punches can be moved out of the way; subslides at the bottom of the large slide are retractable.

All slides and subslides have micrometric shut-height indicators.



This shows how modular units are combined to simplify complex operations. Top is variation

Grand Prize
ARMAND MONARD
9404 211 Street
Queens Village 28, N.Y.

HERE ARE THE WINNERS IN JONES & LAMSON'S NEW HORIZONS CONTEST

2 Second Prizes

ANDY TOROK
19322 Santa Clara
Detroit 19, Michigan

W. H. BRAUN, JR.
11048 Blix Street
N. Hollywood, California

3 Third Prizes

CHARLES LEO SAIDON
24 Endicott Street
Saugus, Massachusetts

JOSEPH C. BARRETTE
24 Rosedale Street
No. Providence 11, Rhode Island

LEON HAROLD RICE
RFD #2, Church Road
Bedford, New Hampshire

10 Fourth Prizes

Edward M. Alexander
RR 1, Box 234
Mooresville, Indiana

C. L. Robinson
1826 Chippendale Street
Houston, Texas

Daniel J. Ruggiero
Main Street, Box 7
Jonesville, New York

George G. Perla
2331 Colonial Avenue, S.W.
Roanoke, Virginia

Thomas M. Jackman
31909 Saginaw Court
Wayne, Michigan

Louis Marcolivio
260 Webster Avenue
Providence, Rhode Island

Euclid U. Lehrt
408 Hillside Drive
Anderson, South Carolina

Bruce J. DeNeve
79 Varian Lane
Rochester, New York

Edward Gagne
30730 Horse Island Drive
Gibraltar, Michigan

Frank S. Woznak
2331 Harrison Street
Schenectady 6, New York

Heartily congratulates the winners of the Jones & Lamson NEW HORIZONS CONTEST. As winner of the Grand Prize, Mr. Monard, who is Methods Engineer with Control Instrument Co., Brooklyn, N. Y., receives a Two-Weeks Luxury Vacation Trip for Two, All Expenses Paid, to his choice of one of the following: Paris, Hawaii, The Caribbean, The Canadian Rockies, Plus $400 for spending money, baby sitter fee, etc.

Mr. Torok (Supervisor, Production Process & Design Section, General Products Division, Ford Motor Company, Dearborn, Michigan) and Mr. Braun (Process Engineer, Hughes Aircraft Co., El Segundo, California) as Second Prize winners each receive a Seven-Day All-Expenses-Paid Luxury Vacation for Two to Bermuda, Plus $200 spending money.

The three winners of Third Prizes each receive a Shopmaster Combination Saw-Jointer Power Tool, complete with motor.

The ten winners of Fourth Prizes each receive a Shopmaster Individual Single-Purpose Power Tool (a choice of Saw, Drill Press, Jointer, etc.)

The Board of Judges, in announcing its decision, remarked that the general excellence of the many entries received made the judging process a most difficult one.

To all those who expressed interest in this contest, we extend our sincere appreciation and thanks.

JONES & LAMSON MACHINE COMPANY
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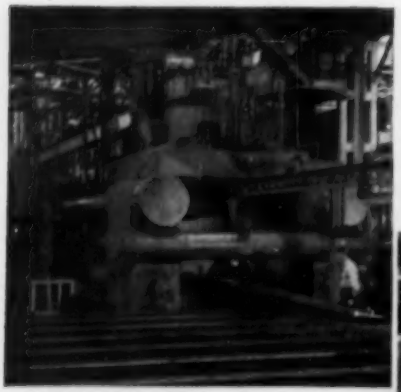
For the King and Queen of Extrusion Presses . . . it's FIRTH STERLING HOT WORK DIE STEEL



Giant press extruding an aluminum spar section.

2500 lb. die blanks and a finished extrusion die of Firth Sterling HWD Hot Work Die Steel.

At Kaiser Aluminum & Chemical Corporation's Halethorpe Extrusion Works, operated under a U. S. Air Force lease, are two 8,000 ton capacity extrusion presses—the largest operating units designed and built in the United States. Presently extruding large, complex aluminum shapes—wing spars, wing panel sections, and missile hull sections, for the aircraft industry, the two giant presses, named Rex and Regina, utilize dies made from Firth Sterling Hot Work Die Steel.

Yes, Firth Sterling HWD is a monarch in its own right, with properties capable of withstanding the tremendous pressures of this king and queen of extrusion presses. This intricate process requires materials that can operate continuously in volume production without replacement. These giant presses each weigh 1500 tons and are capable of extruding aluminum shapes more than 85 feet long and over 1200 pounds each in weight. The use of Firth Sterling HWD is tangible evidence of the high opinion modern die makers have of the quality of the material.

HWD Steel is just one of the Firth Sterling line of more than 50 Tool and Die Steels. Ask for a Firth Sterling engineer to cooperate in your next die making problem to assure the correct grade and analysis.

R-326

Firth Sterling

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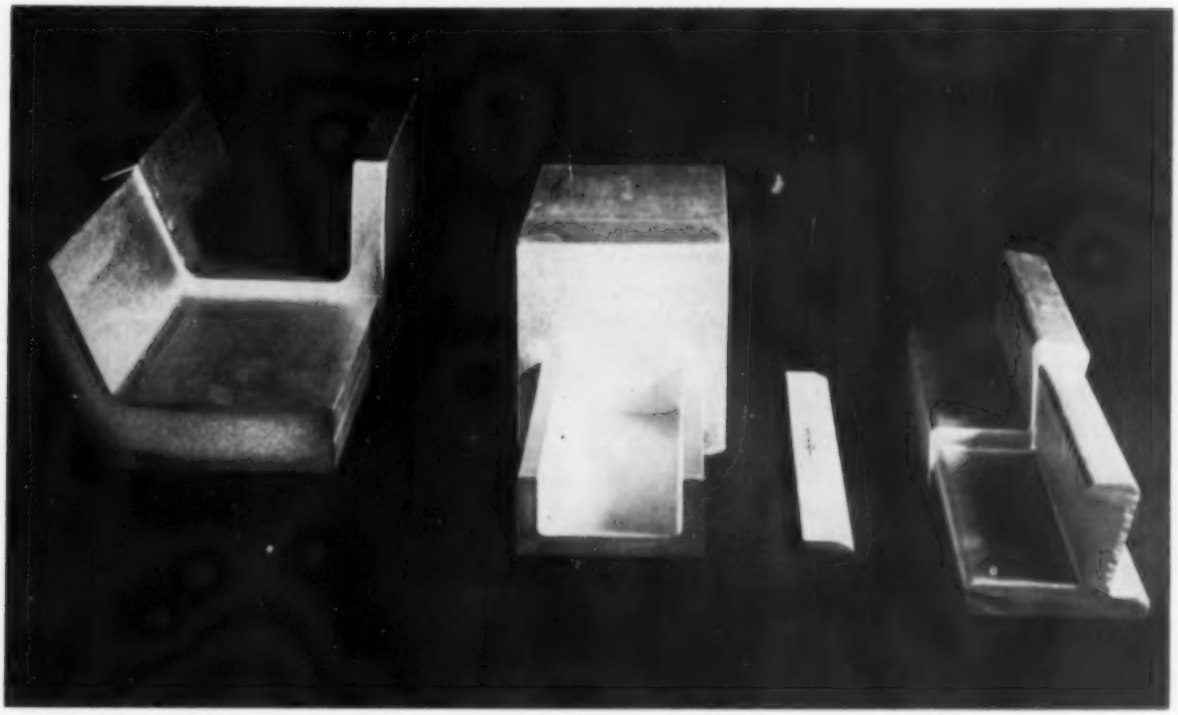


Typical stepped aluminum extrusions

Extruding Metal Where It's Needed

Step extrusion of aluminum allows greater design flexibility in aircraft parts. In future, extrusions may have two or more steps along their length

DEMANDS of industry for more complex sections and closer tolerances have spurred the technology of the extrusion process. One of its products is the stepped aluminum extrusion.

Several methods have been used to extrude parts with variable cross sections. An early process used tapered or stepped mandrels that produced tapered hollow extrusions, which then were split longitudinally to make relatively simple sections. Dies with externally operated, movable segments have been used.

Current—Today, step extrusions are produced with two sets of dies. The small or minor section is extruded first; dies are changed; and the major section is extruded. In most cases, dies are made in two parts so they will be easier to remove from the extrusion.

Improved press design allows a modification of this process; a secondary locking arrangement holds the minor dies in position. If single-piece dies are used, the minor must be stripped off the extruded section and the major die threaded over it.

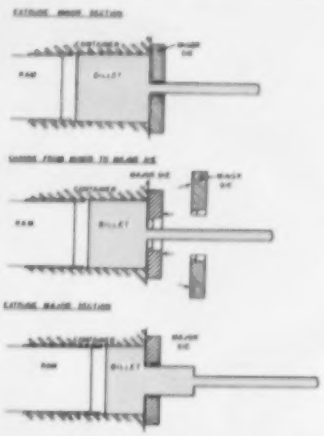
Tolerances — Stepped extrusion tolerances differ from those of normal extrusion in straightness and step area dimensions. The greatest straightening problems usually come in the junction area (8 in. on either side of the step). This is due to the abrupt change in flow conditions.

Cross-sectional tolerances of stepped extrusions usually are greater than normal due to the inherent instability of split dies. An additional tolerance usually is required on dimensions that fall across the parting lines of the dies because of the possible shifting of the die segments.

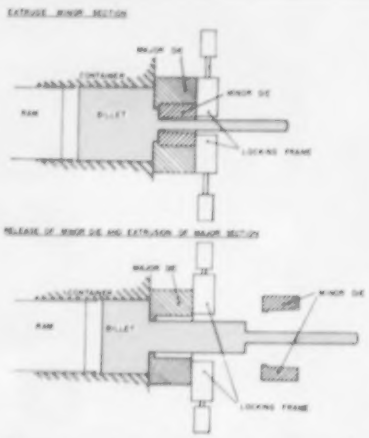
Properties—The junction ends of the major section sometimes contain areas not in the direct flow path which have reduced mechanical properties. They are removed by machining.

The cross-sectional areas of major and minor sections and the ratio of major area to minor area also have a marked influence on

By C. J. HUFFMAN
Technical Superintendent
Halethorpe Works
Kaiser Aluminum & Chemical Corp.
Halethorpe, Md.



Step extrusion process using two sets of dies



Step extrusion process using secondary locking frame

EXTRUDING METAL . . .

mechanical properties.

Reduction—In normal aluminum extrusion, mechanical properties depend on the degree of working the cast ingot receives, as measured by the reduction ratio. Aluminum alloy 7075 yields substandard properties when reduction ratios are less than about 6:1.

In step extrusion, the designer usually has no knowledge or control of the container size on which a part is to be produced. To make the section producible under optimum conditions, the major area to minor area ratio should not exceed 5:1.

In some cases, owing to differences in areas and thicknesses, it will be necessary to work to two sets of allowable design stresses in the major and minor parts. Because the producer cannot vary extrusion temperatures rapidly enough to create ideal conditions for both sections, a compromise is necessary.

Finishing — Step extrusions require the same finishing operation as normal products. A typical sequence for processing 7075 aluminum alloy would be: Extrude, solution heat treat, stretch straighten, cut to length, age.

In solution heat treating, time at temperature is determined by the thickest part of the major section. The normal practice in stretching is to grip each end of the section in a hydraulic unit and exert the necessary stretching force to straighten the part.

Because of the differences in area, the minor section takes the permanent set in stretching. In some cases, it is necessary to straighten the major section and step area on a gag press. This should be done before solution heat treatment to avoid residual stresses.

Warpage—All step extrusions are machined to varying degrees, and warpage following machining is frequent. This is probably aggravated by differential residual stress patterns in the minor and major sections.

Experience on plate has indicated that a 2 per cent permanent set stretch will virtually eliminate warpage after machining. Experience on extrusions indicates similar results may be achieved by stretching.

The optimum amount of stretching required has not been clearly established. A possible approach to the problem would be additional stretching and machining which would result in a part uniformly stretched throughout the length.

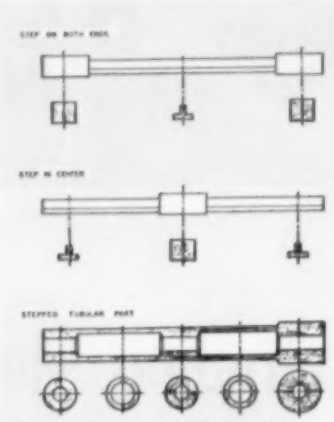
Future—It has long been considered a possibility to produce parts with two, three or more steps. Three or more sets of dies would be needed.

This would introduce additional operations and increase tooling costs which would add to the price of the section. In most cases, it is difficult to economically justify additional steps.

New Shape — A part with a major section on both ends is a possibility. This would allow an integral fitting to be used on both ends of the part.

Many step extrusions are used for aircraft spar cap applications. Future requirements may dictate that the major portion be in the center of the part. Such a part could be used for aircraft stabilizer spar caps extending completely through the fuselage, or for similar applications on the wing. In some cases, the enlarged portions could be used as attachment points for landing gear.

Tubular Parts—Applications for large tubular parts are being developed for missiles. Internal and external steps on these tubes can be obtained with a stepped mandrel.



Step extrusions which might be produced in the future

Modern extrusion equipment makes it possible to place these steps at either end of the tube or in the center.

Integrally stiffened panels for aircraft are becoming common. They are available in widths up to 25 in. extruded flat. Development work indicates greater widths are available from existing equipment. Frequently, this type of section will be extruded in a V or tubular shape to greater widths.

Tubular parts with external or internal rifling have been extruded for some time. These techniques have developed to a point where it is possible to maintain close tolerances on the degree of the spiral. The parts are used in missiles.

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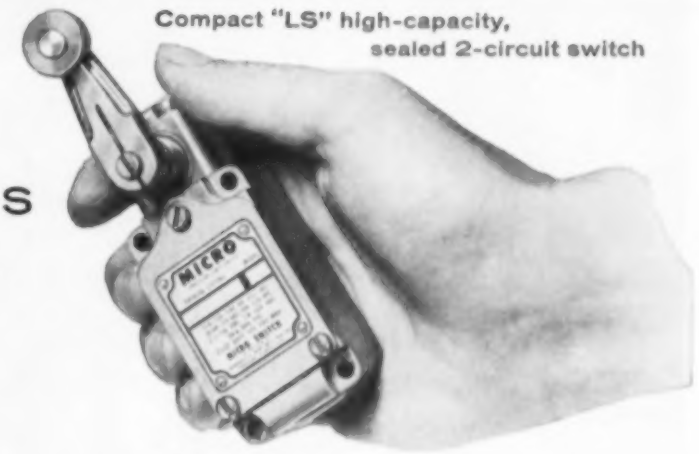

Compact "LS" high-capacity, sealed 2-circuit switch

The MICRO SWITCH "LS" limit switch fills the need for a small, rugged, reliable, two-circuit precision switch to meet the widest possible switch requirements.

All moving parts and the switching chamber are completely sealed, protected from wear or becoming fouled. Field adjustability permits its use in practically any type of application or location.

Two-circuit contact arrangement allows flexibility in circuit design. Reliability of the precision, snap-action unit assures accurate repeat operations throughout many millions of hard, fast actuations. Small and compact in size, this switch is a precision device—yet it is designed and built to stand the most severe abuse.

Like many other precision switches in the MICRO SWITCH line, this versatile switch is ideal for installation on present plant equipment as a limit, interlock or safety switch. So used, MICRO SWITCH precision switches make machinery more automatic, more productive and safer in operation.

FIELD ADJUSTABLE ACTUATOR

The roller arm actuator is field adjustable through 360 degrees, positively locking in any position. Actuators are assembled to operate in either direction. They can also be converted to operate in one direction only, clockwise or counterclockwise.

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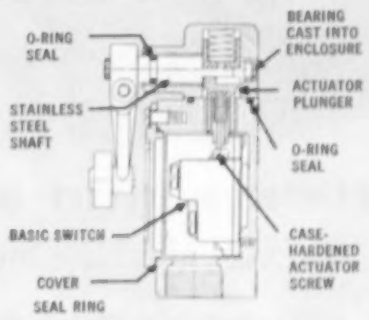
Sealing is provided by use of O-ring seals on the actuator shaft and between the actuator head and the housing. A synthetic rubber ring seal is provided for the cover. These seals protect against entrance of dust, oil and other liquids. The switch meets NEMA specifications for an oil-tight pilot device.



TWO-CIRCUIT, DOUBLE-BREAK CONTACT ARRANGEMENT

The electrical rating is: 10 amperes 120, 250 or 460 volts a-c; ½ H.P. 125 volts a-c; 1 H.P. 230 volts a-c; .8 ampere 125 volts d-c; .4 ampere 250 volts d-c; .1 ampere 550 volts d-c. Pilot duty rating is 600 volts a-c max.

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but U. S. Matchless Steam Hose *kills all the risk*

Scalding steam—a roaring, raging demon hot enough to cause severe injury or death on contact—is tamed and controlled by U. S. Matchless® Steam Hose. After long, safe service (even with steam pressures up to 200 pounds) the wall structure, instead of bursting, allows a trickle of steam to merely *leak* through—acting as a safety valve and giving notice that it's finally time for a replacement. That's why plant safety councils everywhere firmly approve of the U. S. Matchless.

This great hose delivers long service. Despite its great strength, it is as flexible and easy to handle as cotton hose. It is used for steam lines in railroad yards and in roundhouses, steam pile drivers, steam supply lines from docks to oil barges, and steam lines in manufacturing plants. Other important uses are fire protection in oil refineries, thawing out tank cars, steaming out drums in chemical, soap and paper plants and paper mill black liquor recovery systems. U. S. Matchless Steam Hose is obtainable through any of the 28 "U. S." District Sales Offices, or write us at Rockefeller Center, New York 20, N. Y.

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Mechanical Goods Division

United States Rubber

Traveloader unloads boxes at tube cleaning building

One Truck Does the Work

A builder of heat exchangers finds one truck can do all his handling work. It loads and unloads itself, carries long loads through narrow doorways and city streets

A KNOTTY material handling problem at Foster Wheeler Corp., Carteret, N. J., was solved by a side-loading fork lift truck that travels over rough ground and city streets.

The company builds heat exchangers for the Atomic Energy Commission. Tubes and rods are shipped and handled at the plant in boxes 31 ft long which weigh up to 3000 lb.

Handling—The boxes have to be unloaded and stacked in an outdoor, unpaved storage yard; moved from storage into a building where the tubes and rods are chemically cleaned, tested and inspected; and transported from this building to another where the heat exchangers are assembled.

Because of the quantity of tubes and rods involved (about a half-million pieces each), a considerable area had to be established for storage and cleaning. By specification, final assembly of the units must be done in a building that is separated from all manufacturing facilities.

Assembly — The weight of the completed heat exchangers necessitated locating the final assembly building close to a railroad spur to facilitate shipping. Unfortunately, the only practical spot was on that portion of the company's property which was separated from the rest of the facilities by a railroad track.

It was impossible to install a vehicular crossing over these tracks. This meant that the tubes had to be transported through city streets to move them from the tube cleaning building to final assembly.

Ruled Out—The diversity of the operations ruled out doing all handling by standard fork truck alone. Because of low speed, and the length of the loads, this type could not travel the city streets.

A flat-bed road truck was ruled out because extra equipment and operators would be needed in the yard, in the cleaning building and in the final assembly building to load and unload it.

Use of a straddle carrier would have required at least one extra piece of equipment (a crane or fork truck) and an extra operator in the storage yard to unload incoming shipments and stack and unstack boxes.

Side Loader — The side-loading fork truck, with one operator, can handle all the work. With forks, it can load and unload itself, stack and unstack. It can operate in the unpaved storage yard.

The truck has two decks which are connected on the left side, with a bay between them on the right. The mast and forks operate in the bay. Forks extend to the side hydraulically to pick up and deposit loads, and retract to place loads across the decks. Capacity of the unit is 10,000 lb; lift range is 12 ft.

It carries its load parallel to its direction of travel, so the length of the boxes is no problem on the city streets or in and out of plant doors. It has springs, head and taillights, turn signals and can travel up to 30 mph. Known as the Traveloader, made by Baker-Raulang Co., Cleveland, it can operate on city streets without disrupting traffic.

Fairless Works

uses

RESEARCH-COTTRELL PRECIPITATORS

for these gas cleaning jobs

Eleven Research-Cottrell Precipitators, handling 927,160 cubic feet of gas per minute with collection efficiencies of 95% and over, are installed or are being installed at U. S. Steel Corporation's Fairless Works.

Precipitators for blast furnaces and detarring are old, familiar applications for Research-Cottrell. At the end of 1955, 162 blast furnace and 464 detarring precipitators had been installed by Research-Cottrell, including these recent installations at the Fairless Works.

Scarfing and sintering machine applications are fairly recent developments, however. At present Research-Cottrell has installed two scarfing machine precipitators. Five iron ore sintering machine precipitators are in operation, and one more is under construction.

Research-Cottrell has also developed and installed precipitators for electric furnaces, ferromanganese blast furnaces and iron cupolas. For more information on any of these "steel industry" applications contact your nearest Research-Cottrell representative—or write for Bulletin GB.

Research-Cottrell, Inc.

Main Office and Plant: Bound Brook, N. J.
405 Lexington Ave., New York 17, N.Y. • Grant Building, Pittsburgh 19, Pa.
228 N. La Salle St., Chicago 1, Ill. • 111 Sutter Bldg., San Francisco 4, Col.

Scarfing Machines

Two precipitators clean scarfing machine gases (95,000 cfm) from a slabbing mill and blooming mill. Collection efficiency is 95%.

Blast Furnace

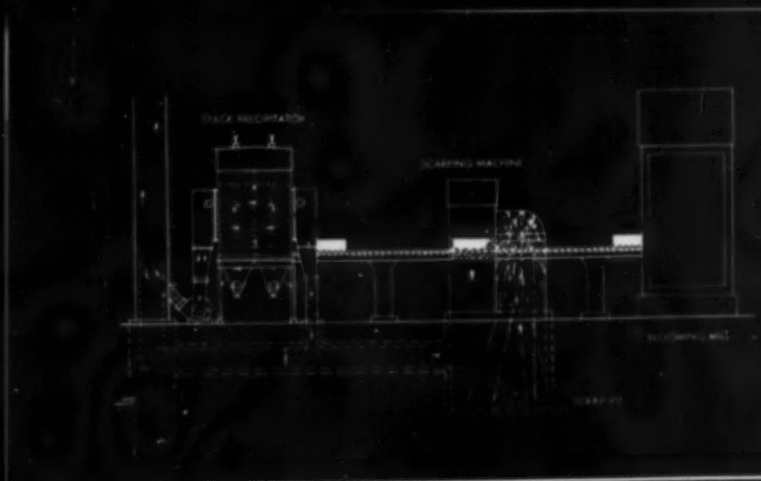
Four precipitators clean gas (330,000 cfm) from two blast furnaces. Efficiency is 95%.

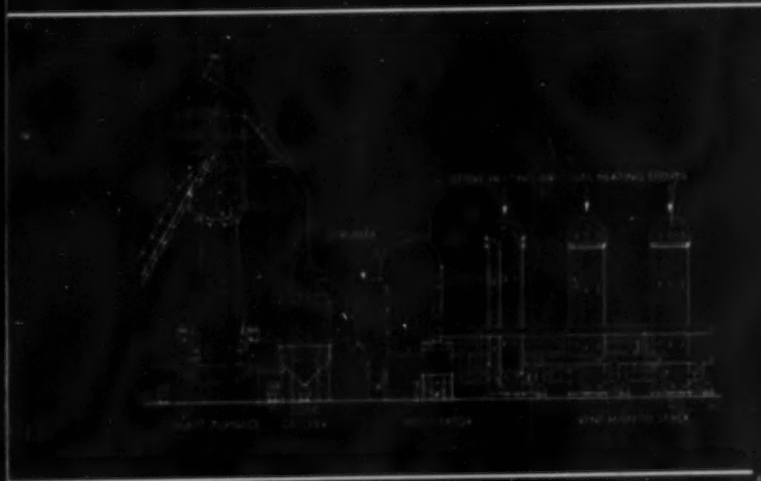
Detarring

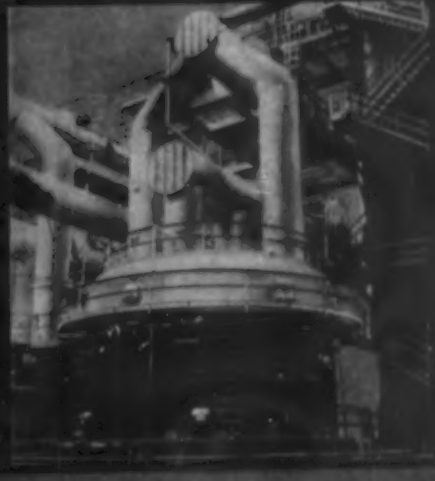
Four precipitators clean coke oven gas (62,160 cfm). Collection efficiency is 95%.

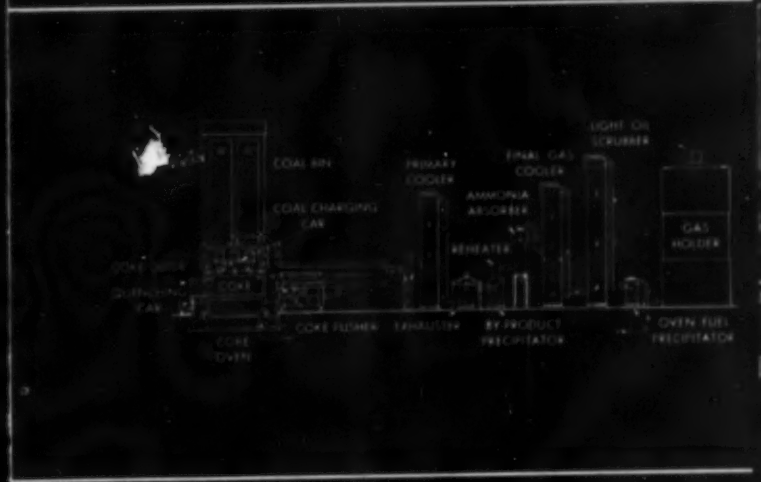
Sintering Machines

One precipitator (see cut-away drawing at right) will clean 440,000 cfm of gas from iron ore sintering machine. Collection efficiency of 95% is guaranteed.





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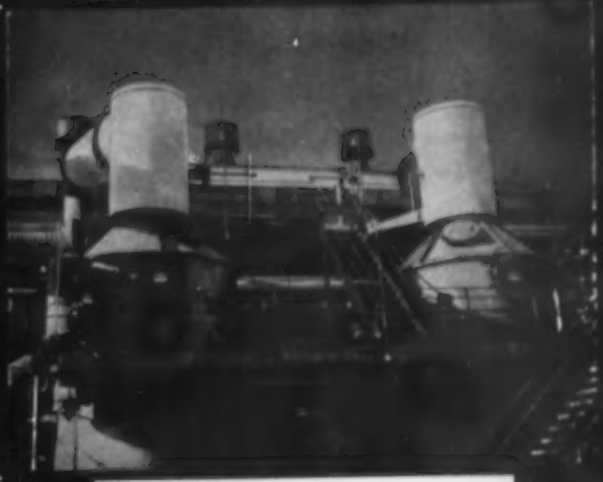
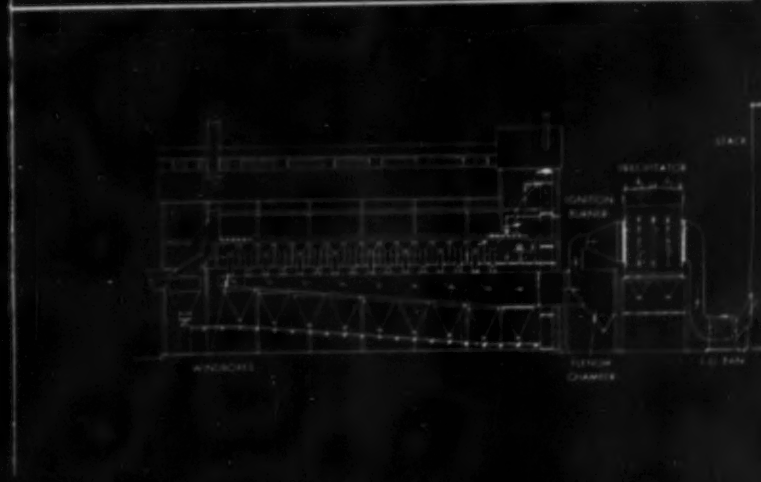
PRIMARY COOLER
FINAL GAS COOLER
LIGHT OIL SCRUBBER
COAL CHARGING CAR
AMMONIA ABSORBER
REHEATER
GAS HOLDER
COKE PUSHER
EXHAUSTER
BY-PRODUCT PRECIPITATOR
COKE OVEN
TAR PRECIPITATOR

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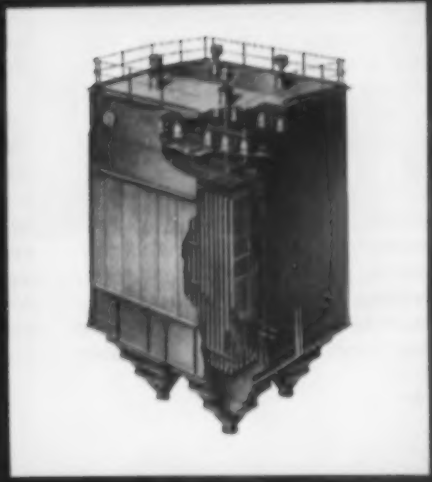
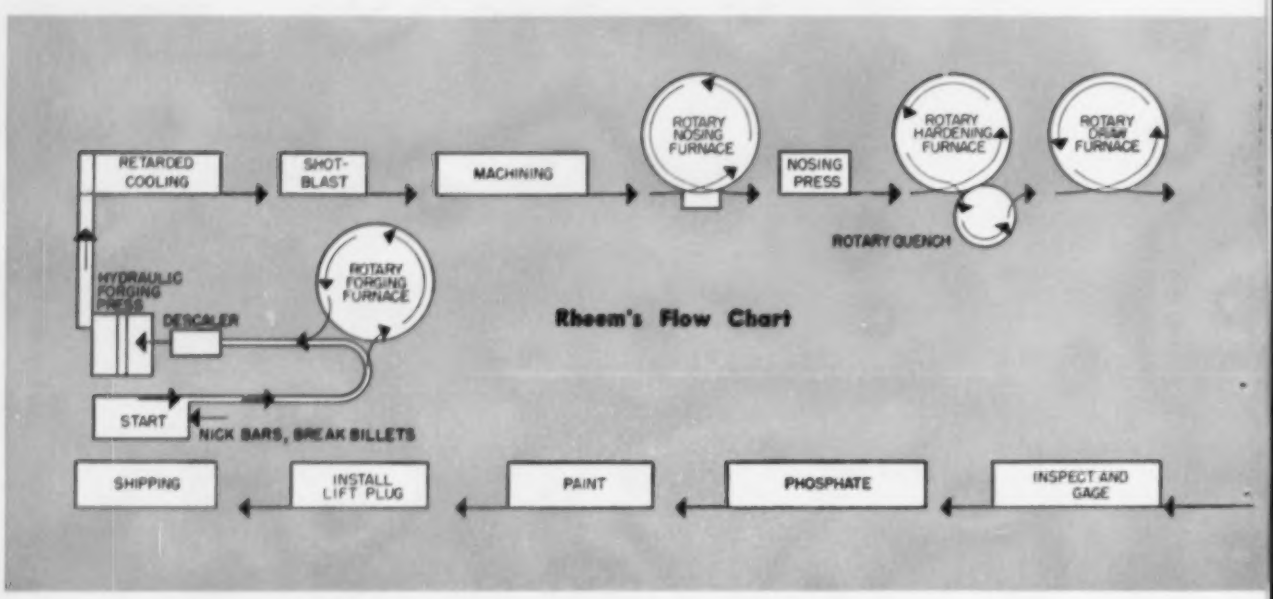




Rheem's Flow Chart

Rotary Furnaces Speed Shellmaking

Billets of SAE 1040 are heated, forged and machined into 155 mm shells in 12 hours by this west coast plant. Mechanical handling couples conveyors with furnaces, cuts labor and reduces operator fatigue

DESIGN your furnaces to fit the production line if you want maximum benefit from them. That's the formula Rheem Mfg. Co. used in its San Pablo, Calif., shell plant.

Four rotary, gas-fired furnaces heat all the billets and shells needed to keep the rest of the production line moving at top speed. Furnace hearths carry the shells 360 degrees; they are loaded and unloaded at the same point.

Mechanical Hand—One of the keys to Rheem's success is an improved manipulator. To charge or unload a furnace, an operator merely grasps handles that resemble motorcycle handlebars; twisting the grips pneumatically controls a tong at the end of a long boom. The entire mechanism hangs from a trolley and pivots easily in all directions. Loaded or empty, the manipulator balances itself automatically, minimizing operator strain.

Shellmaking begins with bars of SAE 1040 steel, which are nicked and broken into billets. They are loaded into the forging furnace after hand cleaning and chipping.

Nine burners mounted around the furnace heat the billets to 2350°F in an hour and a half. The stationary and rotary sections of the furnace are separated by a water seal, which is shielded to reduce fuel and water consumption. Several syphon vents above the water trough keep out water vapor.

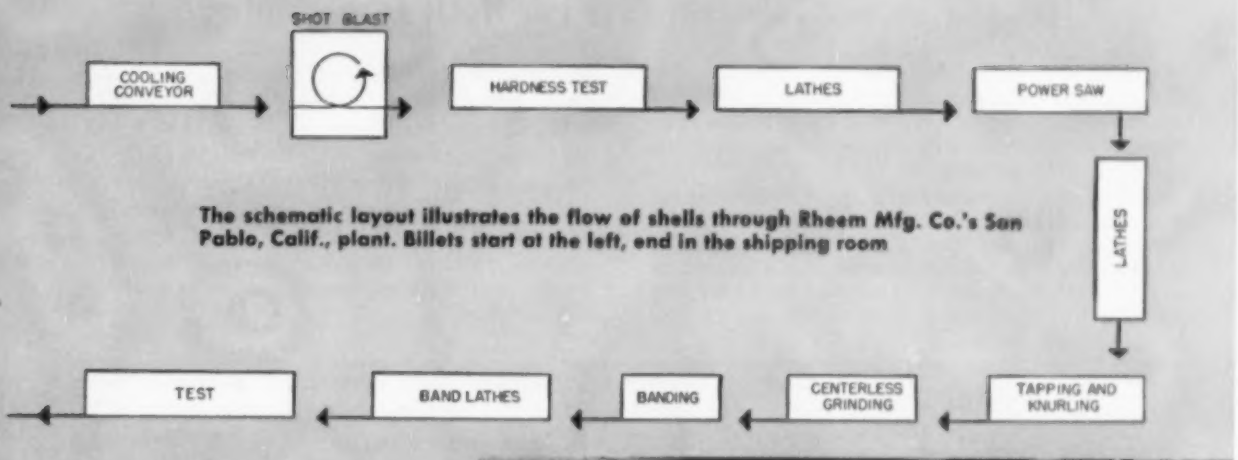
Hot Nose—After the billets are pierced and drawn, they roll through a 75-ft, retarded-cooling conveyor to the rough turning operations. Shells are reheated, and a nosing press completes the general shape.

The rotary nosing furnace has 36 water-jacketed openings, each of which is fitted with a rotating sleeve. As the furnace rotates, the shells revolve and are pushed slowly into the furnace. It's a neat way to get 2160°F at the nose only—the temperature must taper gradually to a black heat 12 in. from the base.

Six nozzle burners fire the nosing furnace from below. Each one is rated at nearly 1.5 million Btu an hour.

Harden and Quench—Heat treating starts in a semimuffle type, rotary furnace. Ten burners, firing over a perforated arch, heat the shells to 1600°F in one revolution of the hearth.

Shells are discharged into a rotary quenching machine, and handled automatically through 24 sta-

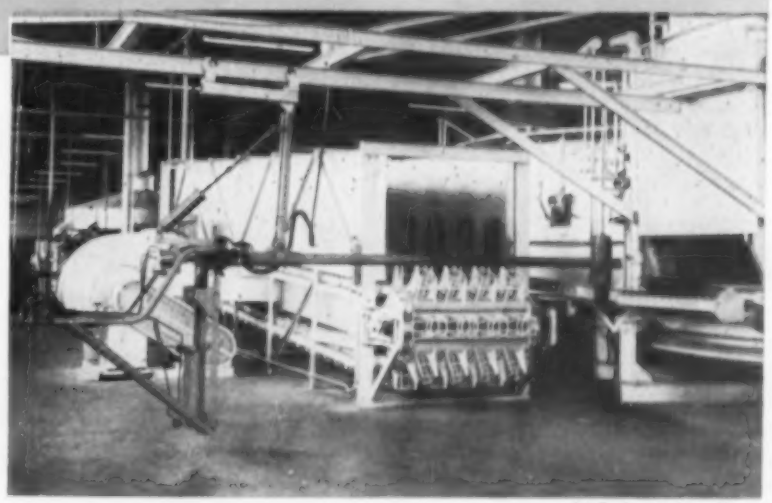


The schematic layout illustrates the flow of shells through Rheem Mfg. Co.'s San Pablo, Calif., plant. Billets start at the left, end in the shipping room

tions. Oil sprayed both inside and outside insures uniform cooling. Quenching takes 8½-minutes; another 3½-minutes is allowed for draining. Quenched shells unload onto a spool conveyor, roll down to the draw furnace.

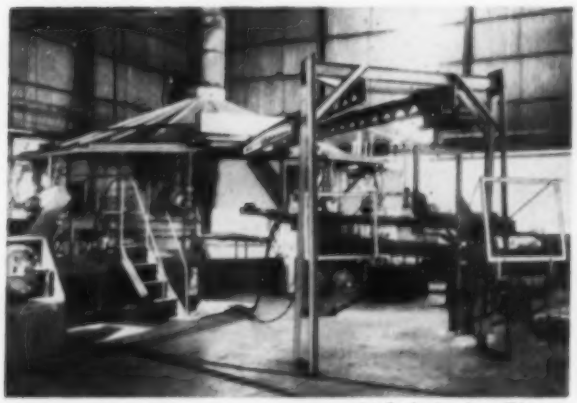
The final rotary furnace draws the shells at 1240°F. A 30-ft conveyor cools the shells in forced air.

After the draw, shells still have 43 operations (such as machining, cleaning and painting) before they are ready for shipping. It takes Rheem 12 hours to make a 155 mm shell.



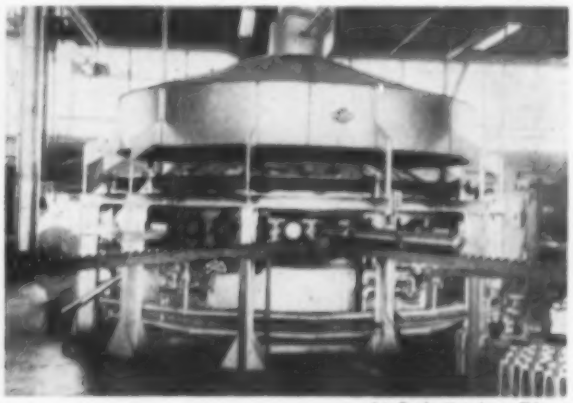
Jet Combustion Inc., Chicago

The 30-ft draw cooling conveyor takes the shells down from 1200 to 125°F. Pneumatic manipulator is controlled by the two grips at the left. Operator twists them to control tong holding the shell (right)



Jet Combustion Inc., Chicago

Billets take 90 minutes to reach 2350°F in the rotary forge furnace. Manipulators are pneumatically controlled, load and unload billets with minimum physical effort



Jet Combustion Inc., Chicago

After a preliminary machining, shells are nosed into the openings in this furnace. As the furnace revolves, sleeves push the shells forward gradually; 2160°F at the nose tapers to black heat 12 in. from base

Reinforcing Rod Plant UPS PRODUCTION 300%

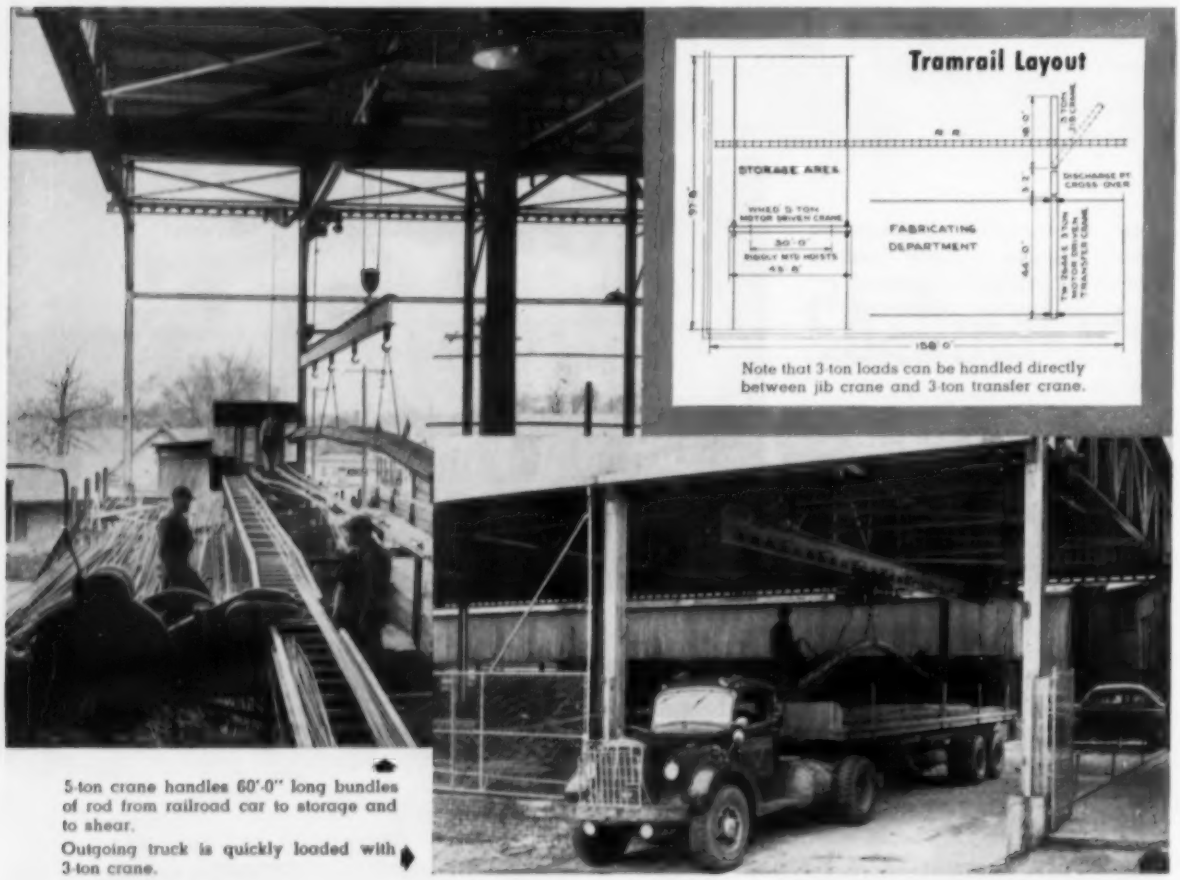
Cleveland Tramrail System Pays For Itself In 6 Months

AFTER a reinforcing rod plant built a new building and equipped it with Cleveland Tramrail cranes, manufacturing costs took such a nose dive that they would make any cost-conscious plant manager blink with amazement.

Whereas eight men were required to work 8 hours to unload a 50-ton car of rods in the old building, two men using Tramrail cranes now do the job in 30 minutes. The Tramrail equipment has enabled doubling the production, and at the same time reducing man-hours by one-half. In other words, the production per man-hour is four times what it formerly was.

The savings have been so phenomenal that the entire Tramrail system was paid for in the first six months of operation.

Nearly every industry is securing important advantages with Cleveland Tramrail equipment. A nearby Tramrail sales engineer will gladly suggest ways that savings can be made in your plant.



Note that 3-ton loads can be handled directly between jib crane and 3-ton transfer crane.

5-ton crane handles 60'-0" long bundles of rod from railroad car to storage and to shear.

Outgoing truck is quickly loaded with 3-ton crane.

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CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
7303 EAST 290TH STREET, WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT

Electronic Comparator Provides Dual Amplifications

Accutron is used for precision measurement and inspection in the shop, toolroom and gage laboratory.

It is available with standard dual amplifications—from 1000 or 2000:1 to 20,000 or 40,000:1.

Amplification within each dual range can be switched without realigning the indicating meter mechanism.

The gage head is adjustable vertically over a range of 6 in. The amplifier has a 4-in., zero center equilinear scale. Needle response is instantaneous, and readings are consistently repetitive.

The fine adjustment control does not cause the indicating needle to shift when the operator's fingers are removed from the adjustment knob. Line voltage fluctuations from 65 to 150 volts have no effect on the electronic gaging circuit.

The gage head is small and tapered, allowing a full view of the workpiece at all times. An interchangeable contact stylus does not require relapping when it is reinserted in the gage. The gage head swivels through 360 degrees, to make the gage usable on a surface plate.

Standard gaging pressure is 8 ounces. Accessory equipment includes a pressure attachment that provides selective gaging pressures of 2 or 4, 8, 16 and 40 ounces.

Other accessories: A gage point lifting device and a three-wire thread checking tip. *Write*: Sheffield Corp., Dayton 1, O. *Phone*: Kenmore 3131

Radial Blade Fan Has High Mechanical Efficiency

The CR combines high volume, high pressure characteristics with a mechanical efficiency above 78 per cent over a broad range.

Inlet-to-outlet streamlining makes the fan suitable for handling dust-laden air.

The smooth bell-shaped curve of the inlet allows the air to enter the fan with a minimum of turbulence.

The inlet bell matches the deep-drawn wheel flange to form a true half-circle entry path into the wheel. There are no obstructions or flat spots.

The radial blades, rigidly welded to the wheel flanges and centerplate, curve smoothly forward at the inlet. The large hub is tapered uniformly.

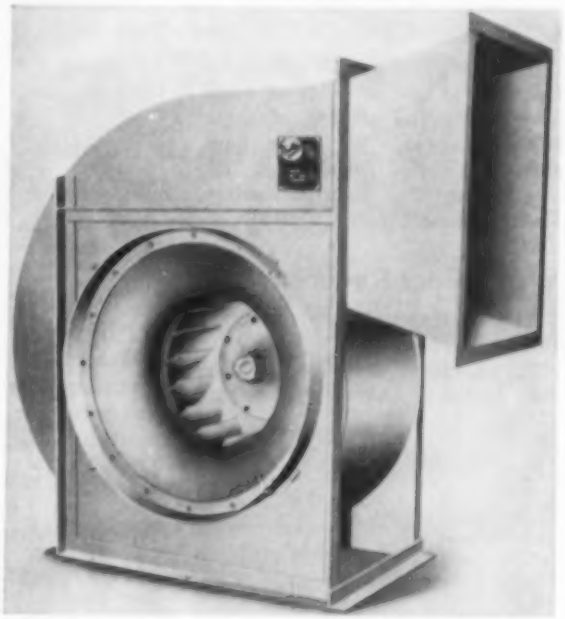
Turbulence is reduced by the outlet which provides a slowly diverging path from the fan cutoff to the duct. The change to static pressure is easy and gradual.

Another fan, the BR, has blades which are wider and spaced closer than the CR's to provide higher capacity at a lower pressure.

The DR fan, with narrower and deeper blades, is a higher pressure type.

Airfoil fans, type BA, perform at 92 per cent mechanical efficiency and are suitable for forced draft as well as industrial air moving service.

Type BLH does heavy-duty industrial air handling (classes II through IV, total pressures of 6¾-in. and up), performs with a mechanical efficiency of 86 per cent.



Variable inlet vanes for accurate volume control can be used on all fans without reducing performance. *Write*: Buffalo Forge Co., 490 Broadway, Buffalo, N. Y. *Phone*: Cleveland 4567

NEW PRODUCTS and equipment

Surface Grinder

Excel 7A is a precision, hand feed unit. Capacity: 6 x 12 in.

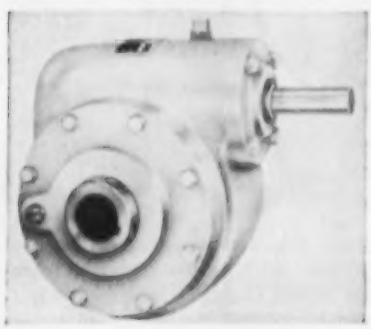
The elevating handwheel is below the level of the table. An operator can see the graduations on the wheel and the point of grinding wheel contact with the work at the same time.

A floating dial pointer eliminates the need to add or subtract when determining the amount of stock to be removed. Ways are hard chrome. *Write*: Department 737, Covel Mfg. Co., Benton Harbor, Mich. *Phone*: Walnut 6-6157

Worm Gear Reducer

This shaft mounted reducer practically eliminates oil leakage.

Its aluminum case has excellent heat exchange characteristics, corrosion resistance and high tensile strength.



Radial shielded bearings are used on the high speed shaft, and tapered roller bearings are used on the low speed shaft.

Worms are cut on alloy steel shafts, and worm gears are made of bronze. *Write*: Electra Motors Inc., Anaheim, Calif. *Phone*: Keystone 5-6061

Scale Remover

Alka-Deox 109 is a white alkaline compound used in a water solution with sodium cyanide to electrolytically remove black oxide or scale from iron and steel.

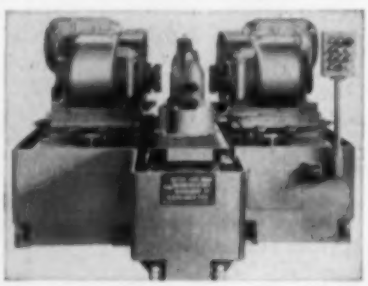
There is no chemical attack on the iron or steel. The material can be used for barrel descaling of small parts such as bolts, nuts and stampings. *Write*: Enthone Inc., 442 Elm St., New Haven, Conn. *Phone*: Spruce 7-5581

Duplex Mill

Opposed milling heads on this unit machine two sides of transmission housings simultaneously.

Indexing of the table and fixture and positioning of the milling cutters and index table are automatic.

The milling heads are universal. They have changeable speeds and



a 2-in. quill adjustment. *Write*: Machinery Mfg. Division, Motch & Merryweather Machinery Co., 888 E. 70th St., Cleveland 3, O. *Phone*: Utah 1-1515

Milling Machine

Five complex milling operations are done with a minimum of tool changes and part handling.

The basic machine consists of a T-shaped welded steel base on which are mounted a rotary table (40 in. in diameter) and a horizontal slide unit carrying a vertical spindle.

Table speed, vertical cutter travel and horizontal slide travel are controlled by stops mounted on the table periphery.

Cutter speeds are adjusted to tachometer settings by a variable speed drive. A quick change collet-type holder simplifies tool changes. Tool setting gages are built into the work fixture that is mounted on the rotary table. *Write*: Snyder Tool & Engineering Co., 3400 E. Lafayette, Detroit 7, Mich. *Phone*: Lorain 7-0123

Power Belt Conveyor

Meshlok moves loads around corners or from floor to floor. Widths of the channel-weave belt range from 12 to 48 in.

The units have an outside radius of 24 or 30 in. Any turn from 30 to 180 degrees is available. Fixed or variable speeds range up to 100 fpm.

Belt-edge design prevents stretching or track jumping. *Write*: Voss Belting & Specialty Co., 5645 N. Ravenswood Ave., Chicago 26, Ill. *Phone*: Longbeach 1-4534

Magnesium Platform

This portable table is used with a loading ramp to permit the parallel loading of rail cars where space at track side is limited.

The 8 x 8 ft platform can be positioned at a freight car door by

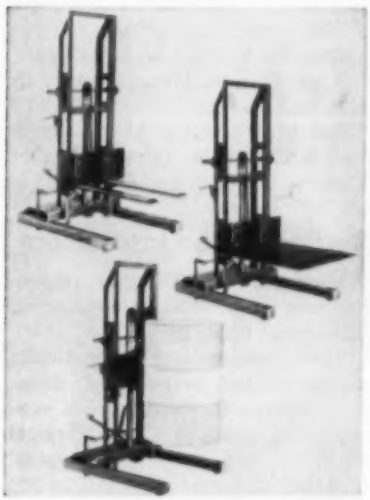
a lift truck. Edges of the deck have safety curbs to prevent power trucks from running off. They also eliminate tire damage.

Load capacities go up to 16,000 lb. Magline Inc., 1900 Mercer St., Pinconning, Mich.

Lift Truck

Forks, platform and drum-handling attachments are key features of this pedal operated, straddle type lift truck.

The forged steel forks can lift 1000 lb to a height of 68 in. A steel platform slips over them to provide a portable loading platform or elevator for small or bulky containers.



The drum stacking attachment handles 55-gallon steel or fiber drums weighing up to 500 lb. *Write*: American Pulley Co., 4200 Wissahickon Ave., Philadelphia 29, Pa. *Phone*: Radcliff 5-4400

Drum Stacker

Fiber and steel drums can be double-tiered by this unit. Any open or closed drum, regardless of its diameter or height, can be handled.

The stacker is semicounterbalanced so that it does not straddle the drum to be picked up; it can pick up a drum between two ad-

M-M's NEW "445" READY FOR ACTION!

with help from Sewall Gears

Minneapolis-Moline's "445" Universal

Here's Minneapolis-Moline's new *Power-lined out-ahead* tractor . . . heralded as one of the biggest advances in power farming history. This is a "user-designed" tractor . . . based on the frank opinions of thousands of farmers, county agents, agricultural experts and farm machinery dealers. Sewall is proud to have supplied gears for the "445".

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Our reputation is based on quality, service and price. If you're like our regular customers you're vitally concerned with these three factors when you buy gears. (1) Gears must meet your specifications exactly, in strict accordance with your prints. (2) Gears must be delivered as scheduled. (3) The price must be reasonable. Sewall gears are made by men who are fussy about specifications. We have a wide range of late-model machine tools, inspection instruments and checking equipment regularly serving customers across the nation. Our large modern plant is handy to rail, truck and air transportation.

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Write for New 4-page Bulletin

The Sewall Story . . . richly illustrated with in-plant photos . . . includes listing of capacities and facilities.

SEWALL GEARS

E. B. SEWALL MANUFACTURING COMPANY

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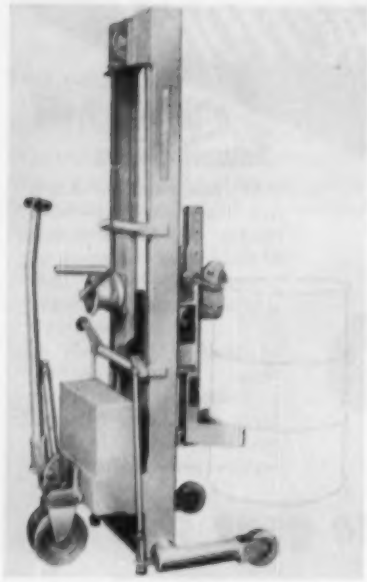
NEW PRODUCTS and equipment



jacent ones without touching either.

Capacity is 550 lb; lifting height to the underside of a standard 55-gallon drum is 38 in. *Write*: Department R-31, Lewis - Shepard Products Inc., Watertown, Mass. *Phone*: Watertown 4-5400

Abrasive Throwing Wheel

The GM Wheelabrator unit for airless blast cleaning centrifugally propels abrasive.

A simple spring arrangement holds blades in the wheel. This locking device is not in the abrasive blast stream nor subject to appreciable wear. The spring can be inserted or removed with a screw driver.

Blades are heat treated alloy steel. *Write*: Wheelabrator Corp., Mishawaka, Ind. *Phone*: Blackburn 5-2141

Flow Measurement

The Series F Flo-Scope measures air and gases. Up to 75,000 cu ft of air can be handled in an hour.

Continued accuracy is assured because the only moving part is not subject to wear. Each unit is calibrated to the customer's needs. *Write*: Selas Corp. of America, Dresher, Pa. *Phone*: Mitchell 6-6600

Timer-Recorder

The Monitorecord is a timing-recording instrument for the split-second monitoring of multioperational automatic machinery.

Up to 14 or more operating sequences can be timed simultaneously to within 1/100th of a second and recorded on a strip card for visual reference.

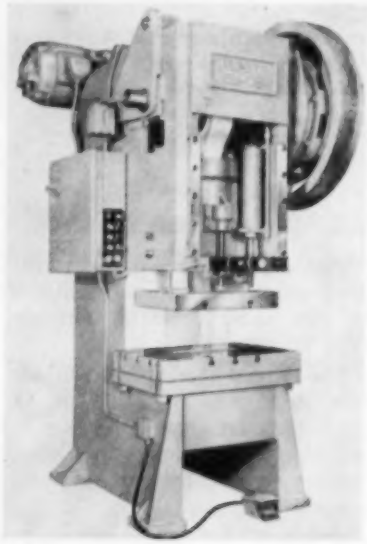
The instrument enables production men to keep tab on production by spotting faulty cycles and adjusting sequences for most efficient production. It can prevent many slowdowns or shutdowns. *Write*: Autometrology Division, Sheffield Corp., Dayton 1, O. *Phone*: Kenmore 3131

Fixed Base Press

Flywheel or gear versions of this 75-ton press are available with single speed or variable drives.

Single speeds of 90 or 120 strokes a minute are standard for the flywheel type, 40 a minute for the geared model.

Standard stroke of the side is 4 in.; maximum stroke available is 8 in.



The press has a long flanged slide with barrel-type adjustment and box-type cast construction to eliminate way deflection.

Bed area is 63 x 24 in. Slide area is 24 x 18 in. *Write*: Minster Machine Co., Minster, O.

Rod and Tube Inspection

Magnatest FW-400 is an inspection unit for nonmagnetic rod, wire, tubing and bars.

The instrument automatically detects seams, overlapping, diameter changes, inclusions, voids, concentrated porosity, metallurgical variation and splits. A typical unit can be operated at 150 to 300 fpm.

Several nonmagnetic materials with diameters of 1/64 to 3 in. are handled, including aluminum, brass, copper, tungsten, austenitic stainless and titanium. *Write*: Magnaflux Corp., 7300 W. Lawrence Ave., Chicago 31, Ill. *Phone*: Underhill 7-8000

Automatic Feeder

Model 2500B has a 45-cu-ft hopper that serves as a storage space for parts.

The machine feeds through multiple chutes to production machines and assembly lines.

It'll handle sliding parts which are 3/16 to 2 in. in diameter and up to 5 in. long, rolling parts which

They may seem the same, but...

American is the name!

Your actual fastening costs include four basic items:
1. Price • 2. Service • 3. Quality • 4. Research • From time to time, you may find local price differentials that seem worthwhile to you. But no-one gives you more of all four than American. • *American gives you more of all four . . . in service,* where American precision deliveries are keyed to the most demanding production schedules, from single-case to car-load lots . . . *in quality,* where production tools are made to extremely close tolerances that exceed normally accepted standards . . . *in research* that developed the original Phillips fastener and showed one manufacturer how to convert a milled-from-the-bar special to a mass-produced cold-headed unit. Nowhere will you find more of the four basic features you need — price, quality, service and research — than from American. *Make your own comparisons:* send us your inquiry for price and delivery or your specifications for special fasteners. Write:

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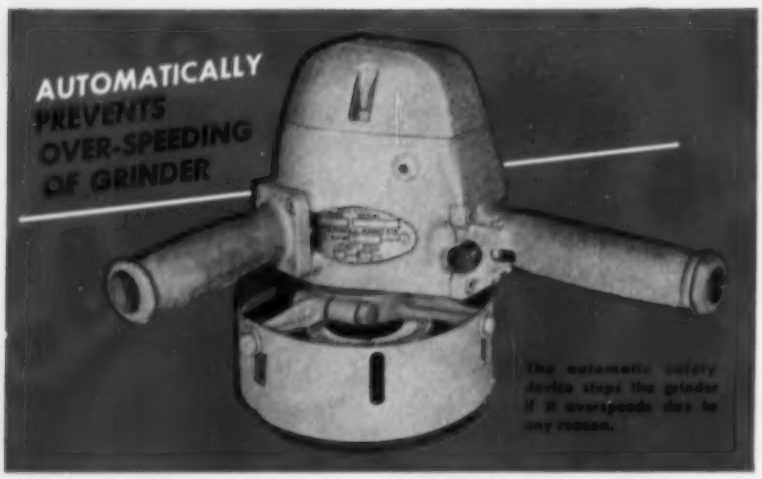
NEW

THE ONLY

SURFACE GRINDER with a POSITIVE SAFETY SHUT-OFF!



PLUS THESE OTHER COST-SAVING OPERATING ADVANTAGES:

- Handles can be set at 90° or 120° for close corner work and operator comfort . . . another Ingersoll-Rand FIRST!
- A responsive governor insures maximum cutting speed and minimum air consumption regardless of load.
- Single point lubrication, double-sealed wheel bearings, large oil reservoir for long life, low cost operation.
- Top of tool is flat for easy pressure application.
- Available in 2 Models and 4 speeds as follows:

  Speeds: 3100—4100—4500—and 6000 rpm.

  Size 41F with push-locking throttle for constant operation.

  Size 41FX with self-closing, safety type throttle.

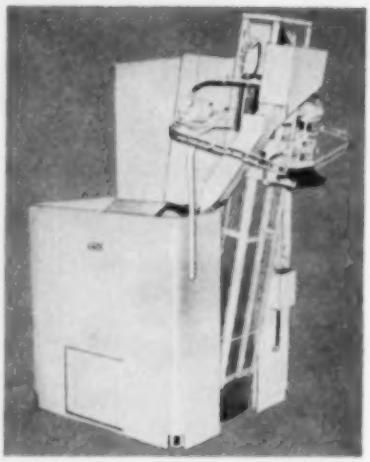
Ask for a demonstration of this new safety grinder in your shop.

S-343

Ingersoll-Rand

11 Broadway, New York 4, N.Y.

NEW PRODUCTS and equipment



are 5 in. in diameter and 3/16 to 1½-in. long. *Write*: Feedall Inc., P. O. Box 47, Willoughby, O. *Phone*: Willoughby 2-8100

Conveyor Lubricator

The 100 series lubricator is enclosed in a nonporous aluminum housing that saves space. There are no problems if the chain backs up.

There are three types of lubricators—for trolleys and chains, for the bearings on slat-type conveyors and for hot zone applications. *Write*: J. N. Fauver Co. Inc., 51 W. Hancock, Detroit 1. Mich. *Phone*: Temple 2-4115

NEW literature

Write directly to the company for a copy

Shock Control

Properties of plate form and multiplane mountings for isolating vibration are given in bulletin 702, 16 pages. Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.

Nonferrous Forgings

Properties, design and uses of brass, bronze and aluminum forgings are treated in a 32-page bulletin. Department C, Customer Service Division, Titan Metal Mfg. Co., Bellefonte, Pa.

Fittings for Tanks

Manhole and handhole fittings for pressure vessels and tanks used to store hazardous liquids are described in a bulletin. Colorado Fuel & Iron Corp., 575 Madison Ave., New York, N. Y.

Plastic Pipe

Flexible polyethylene pipe and fittings are described in bulletin CE-57, 8 pages. American Hard Rubber Co., 93 Worth St., New York 13, N. Y.

Ingot Stripper

This 4-page bulletin describes a portable ingot stripper. Pittsburgh Engineering & Machine Co., P. O. Box 986, Pittsburgh 30, Pa.

Sheet Feeders

This bulletin describes mechanical sheet feeders for handling tin plate, sheet steel and aluminum sheets. Dexter Folder Co., 330 W. 42nd St., New York 36, N. Y.

Lift Trucks

This 12-page bulletin covers lift trucks with capacities of 1000 to 30,000 lb. Hyster Co., 2902 N. E. Clackamas St., Portland 8, Oreg.

Permanent Magnets

Bulletin 156, 16 pages, describes and illustrates industrial magnets in a variety of applications. Department 107, Magni-Power Co., Wooster, O.

Aluminum for Appearance

This 8-page bulletin describes the finishability, anodizing qualities and appearance of alloy 5005. Consumer Service Division, Room 1056, Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.

Radial Draw Formers

This 60-page catalog describes radial draw forming machines—from semiautomatic units that will make

15,000

3/4" bolts uniformly tightened to 60 ft. lbs.

TORSION BAR with new Ingersoll-Rand

Torque Control IMPACTOOL

PROBLEM:	Assembly of 1390 mechanical pipe joints involved over 15,000 ¾" bolts. The problem was to speed assembly, remove guesswork and assure proper tightness of all joints.
AIR ENGINEERING SOLUTION:	A new Ingersoll-Rand Size 5040T Torsion Bar Torque Control Impactool, preset to deliver 60 ft. lbs., was put on the job.
RESULT:	The Torque Control Impactool automatically shut off at the preset Torque all guesswork was eliminated . . uniform joint tightness was produced . . an average of 10 minutes per joint was saved . . . smaller bell holes were required due to compact size of the 5040T this one tool produced an extra profit of $404.25 on this job.

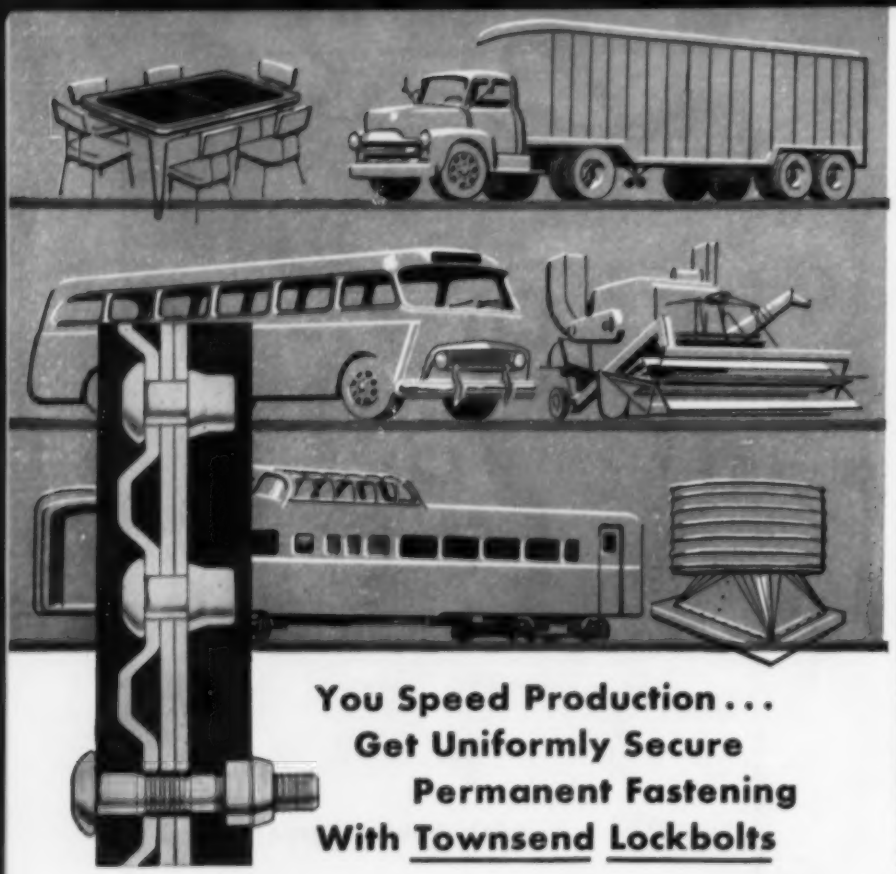
You can put these new "Torsion Bar" Torque Control Impactools on your nut running jobs and reap these benefits: Positive Torque Control . . . Simple Torque Setting . . . Setting remains constant . . . No pressure regulators needed . . . No operator training.

Write or phone for a free demonstration of this revolutionary fastening development.

Ingersoll-Rand

11 Broadway, New York 4, N.Y.

A-344



You Speed Production . . . Get Uniformly Secure Permanent Fastening With Townsend Lockbolts

The Townsend lockbolt provides a quick method of producing uniformly secure fastenings that cannot loosen even under extreme vibration or shock conditions. They combine the advantages of riveting and bolting—eliminate the disadvantages.

Typical users are manufacturers of railroad cars, highway trucks and trailers, buses, farm equipment, industrial ventilators, and furniture. They find that the use of Townsend lockbolts gives them an opportunity to improve their products—reduce unit costs.

These benefits are possible for several reasons. By use of Townsend lockbolts, fewer and less skilled workers can complete an assembly faster than by other methods because the setting action does not depend upon the skill of the operator. The clamping action, or tensile preload is higher than rivets—is more uniform than bolts and nuts. The lockbolt makes possible a more rigid joint because it fills the hole better than other fasteners.

Townsend lockbolts are available in steel and aluminum alloy, in 5/16", 1/4", 1/16", 3/8" and 1/2" diameters, in grip lengths ranging up to 2" in various head styles. Other material and lengths available upon request. They are described in Sweet's design file and in Townsend bulletin TL-101.

For a demonstration at your desk of how to get better, economical fastening with Townsend lockbolts, write on your company letterhead to Townsend Company, P. O. Box 237-C, New Brighton, Pa.

Licensed under Huck patent nos. RE 22,792, 2,114,493, 2,527,307, 2,531,048, 2,531,049, 2,754,703.

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NEW LITERATURE

600 auto trim parts an hour to machines that will handle work weighing up to 300 tons. Cyril Bath Co., 32400 Aurora Rd., Solon, O.

Pumps

Solutions to common troubles of rotary, centrifugal and steam pumps are given in bulletin PC-508 P, 4 pages. Merchandising Sales Department, Worthington Corp., Harrison, N. J.

Tool Steel Handbook

This 204-page book contains data on types, properties and applications of tool steels. Advertising Department, Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

Conveyor Pulleys

Solid steel, lagged and split pulleys are described in a 12-page bulletin, CP-80. Department P, R. & J. Dick Co. Inc., 1 Sade St., Passaic, N. J.

Ceramic Strainer Cores

Strainer cores, splash cores, elbows and tubes are described in a 4-page bulletin. Universal Clay Products Co., E. First St., Sandusky, O.

Surface Plates

Here's a 78-page manual that describes the manufacture of black granite surface plates. Collins Microflat Co., 2326 E. Eighth St., Los Angeles 21, Calif.

Oven Control

Bulletin RT-781 describes a combination gas cock and oven thermostat with an integral automatic shut-off valve. Robertshaw-Fulton Controls Co., 110 E. Otterman St., Greensburg, Pa.

Guide Bin Bushings

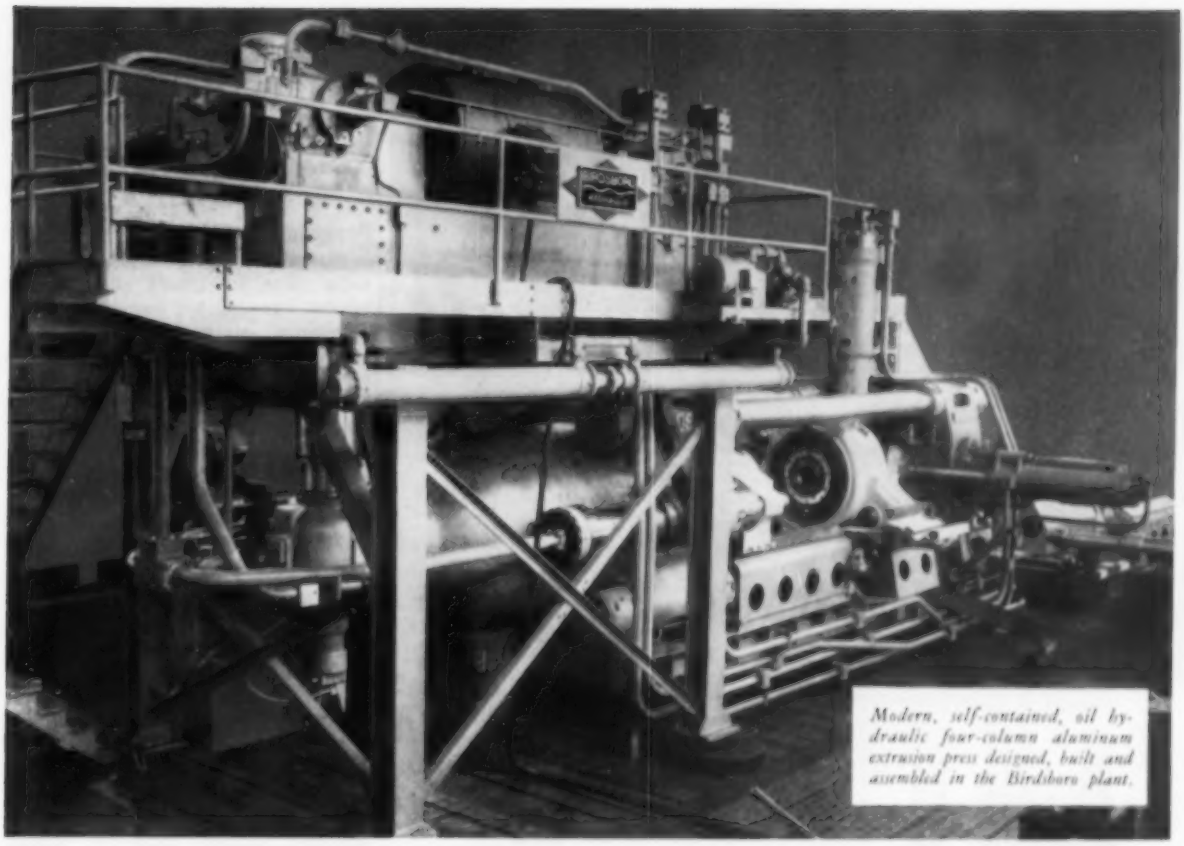
Bulletin 15.404, 4 pages, introduces bushings with a high resistance to wear and a low coefficient of friction. WW Alloys Inc., division of Fansteel Metallurgical Corp., 11644 Cloverdale Ave., Detroit 4, Mich.

Motors

Direct-current motors, 1/8 to 200 hp, and motor-generator sets up to 200-kw output are described in bulletin 53B8424, 6 pages. Two-pole squirrel-cage motors, 900 hp and larger, are described in bulletin 05B8123A, 6 pages. Allis-Chalmers Mfg. Co., 1021 S. 70th St., Milwaukee, Wis.

Power Distribution

Bulletin GEA-5900, 28 pages, presents ideas for improving electric power distribution practices. A 43-



Modern, self-contained, oil hydraulic four-column aluminum extrusion press designed, built and assembled in the Birdsboro plant.

BIRDSBORO DESIGNS NEW EXTRUSION PRESS

for high speed production of intricate aluminum shapes

• Here is Birdsboro's new, modern design press . . . timed to meet today's needs for safe, rapid and efficient extrusion of billets of aluminum and its alloys.

Rated at 2750 ton capacity, the press is capable of making extrusions from billets 8″ to 12″ in diameter x 32″ maximum length. It can also be fitted to handle billets from a general rectangular container 4″ x 16″.

The press features a unique die slide which permits insertion of a die stack in either of two locations. Developed to provide high production, this feature allows extrusion to proceed through one die while a second die stack is being inserted, removed or dressed.

The hydraulic system consists of three large oilgear pumps, two constant delivery at 108 gpm and one featuring electronically controlled variable delivery at 108 gpm.

Discover for yourself how the new line of Birdsboro-designed extrusion presses can give you new shortcuts to low-cost, high-speed production of intricate aluminum shapes. Drop us a note on your company letterhead for additional information.

PHYSICAL DIMENSIONS:

Over-all length	34′6″
Height at highest point over vertical shear	14′8″
Location of Centerline from floor level when installed	3′6″
Weight when installed	380,000 lbs.

BIRDSBORO HYDRAULIC

BIRDSBORO

STEEL FOUNDRY AND MACHINE CO.

BIRDSBORO, PA. New York Office: Engineering Supervision Co., 120 W. 42nd St., New York 36, N.Y.
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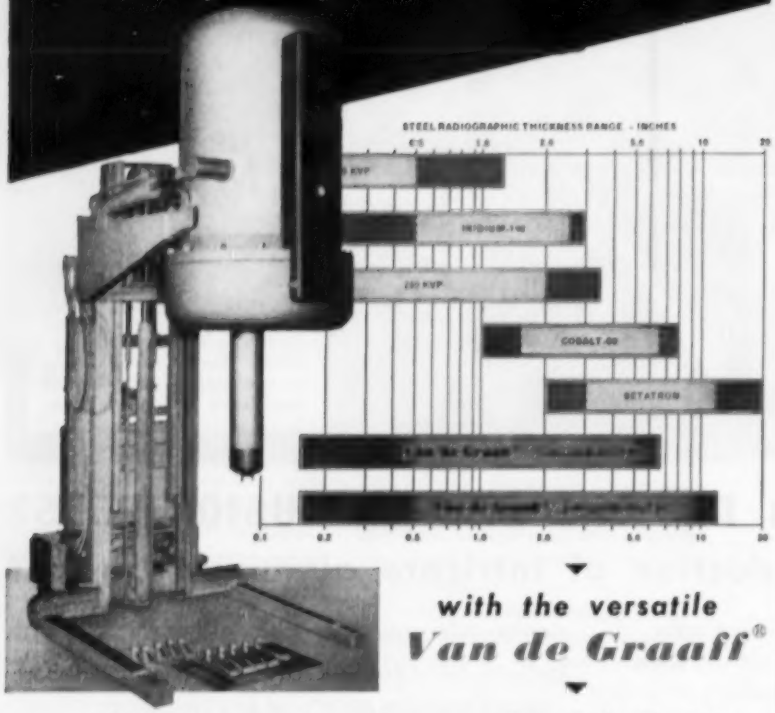

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NEW LITERATURE

page manual, GED-3224, is designed to help industrial companies determine optimum power distribution investment. Apparatus Sales Division, General Electric Co., Schenectady 5, N. Y.

Precision Balls

This bulletin gives information on balls made of chrome alloy, brass, bronze, beryllium copper, Monel, aluminum, sintered carbide, high temperature steel and Stellite; miniature and instrument grade balls; and balls for oil tools. Universal Ball Co., Willow Grove, Pa.

Miniature Thermocouples

Bulletin 2, 10 pages, gives instructions on selecting bayonet thermocouples. Thermo Electric Co. Inc., Saddle Brook, N. J.

Air Gaging

Principles of air gaging internal and external dimensions are depicted in a 12-page bulletin. Division 610, Sheffield Corp., Dayton 1, O.

Material Handling Trucks

This 132-page catalog details electric fork trucks, walkie fork trucks, stackers, cranes, hand lift trucks and other material handling trucks. Department 33, Lewis-Shepard Products Inc., Watertown, Mass.

Drill Catalog

This 206-page catalog, No. 56, covers a complete line of tools, including 13 new drill sets, carbide tipped and solid carbide end mills, carbide tipped die drills, solid carbide short series straight shank drills and cutoff blades. Cleveland Twist Drill Co., 1242 E. 49th St., Cleveland, O.

Panel Controls

Alternating current control systems for automatic oil, gas and combination burners are depicted in bulletin CA-22, 16 pages. Department CN-10, Combustion Control Division, Electronics Corp. of America, 77 Broadway, Cambridge 42, Mass.

Welding Fittings

Carbon, alloy and stainless steel seamless fittings and forged steel flanges are described in bulletin FB-502, 6 pages. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Welding Equipment

Semiautomatic and automatic equipment used in CO_2 and inert gas arc welding are described in a 6-

NEW LITERATURE

page bulletin. National Cylinder Gas Co., 840 N. Michigan Ave., Chicago 11, Ill.

Lock Washer

A spring steel lock washer with a vibration dampening grip is described in a 4-page bulletin. American Stamped Fastener Co., P.O. Box 116, Roselawn Station, Rochester 18, N. Y.

Powder Metal Presses

Bulletin 815, 24 pages, describes powdered metal presses with capacities of 1½ to 300 tons. F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.

Nickel-Lined Pipe

Fabrication techniques and information on nickel-lined pipe and fittings are presented in an 8-page bulletin. Bart Mfg. Corp., 229 Main St., Belleville 9, N. J.

Fractional Motors

Motors from 1/20 to 1 hp are described in a 10-page bulletin. Century Electric Co., 1806 Pine St., St. Louis 3, Mo.

Industrial Trucks

Here's an 8-page bulletin that gives data on pallet trucks, high and low lift platform trucks, tractors and other models. Moto-Truc Co., 1959 E. 59th St., Cleveland 3, O.

NEW BOOKS

Recommended Equipment and Procedure for the Palletized Loading and Shipment of Refractory Products, Refractories Institute, First National Bank Bldg., Pittsburgh 22, Pa. 46 pages, $1.50.

This revised manual covers the standard wood pallet; pallet load protection; carloading patterns; palletizing of insulating firebrick and bulk materials in bags, drums and cartons; standard wooden end gates; a method of carloading empty pallets for return shipment; and quantities of brick per pallet.

Elevated-Temperature Properties of Coppers and Copper-Base Alloys, American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. 248 pages, $5.50.

Here is a graphical summary of elevated temperature data on wrought coppers and cast and wrought copper alloys. Information includes modulus of elasticity, tensile strength, yield strength, reduction of area, elongation, stress for various creep rates and stresses for rupture.

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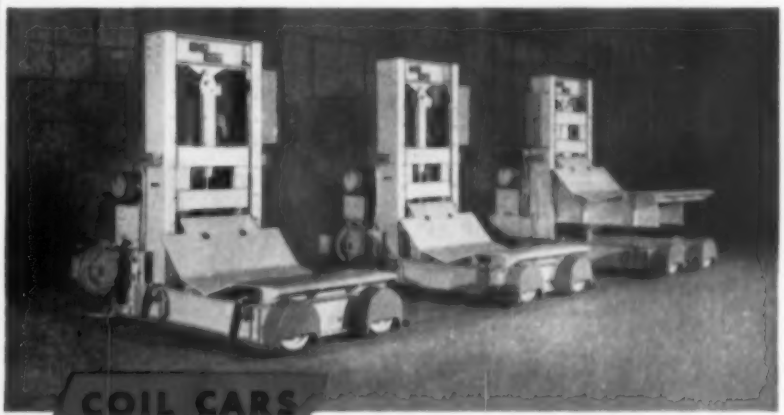
"Complete Processing and Handling Equipment . . . for any Ferrous or Non-Ferrous Material . . . That Starts — or Ends — as a Coil"



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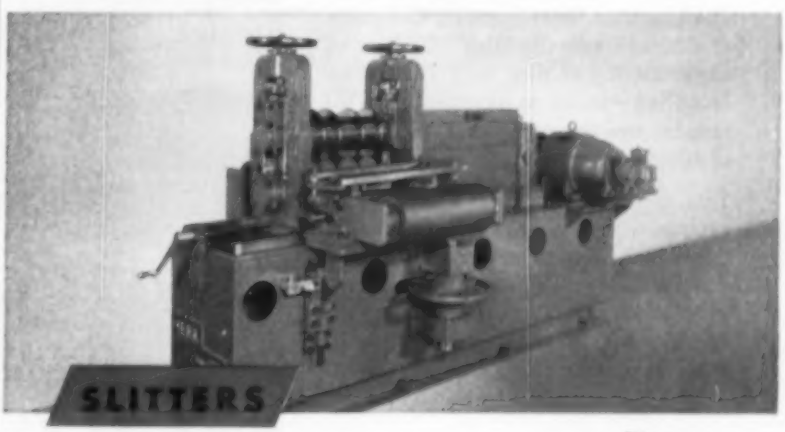

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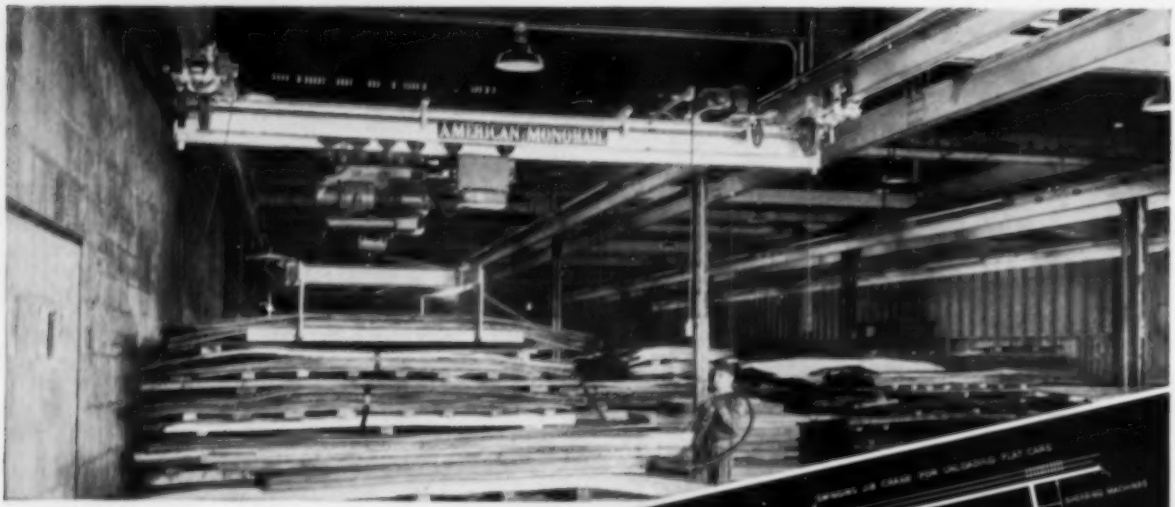

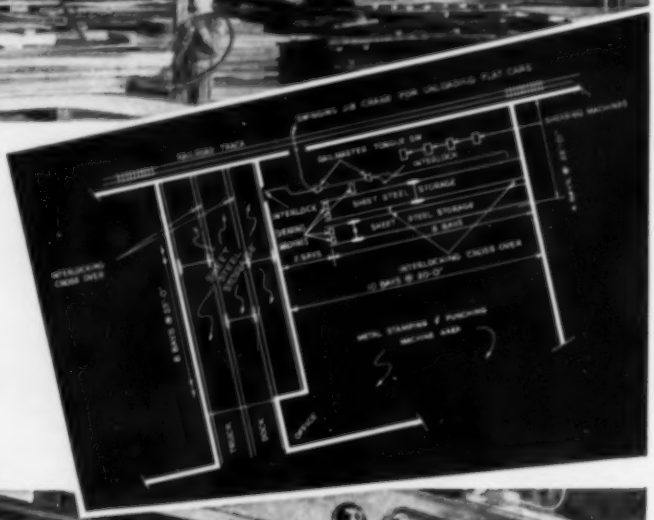

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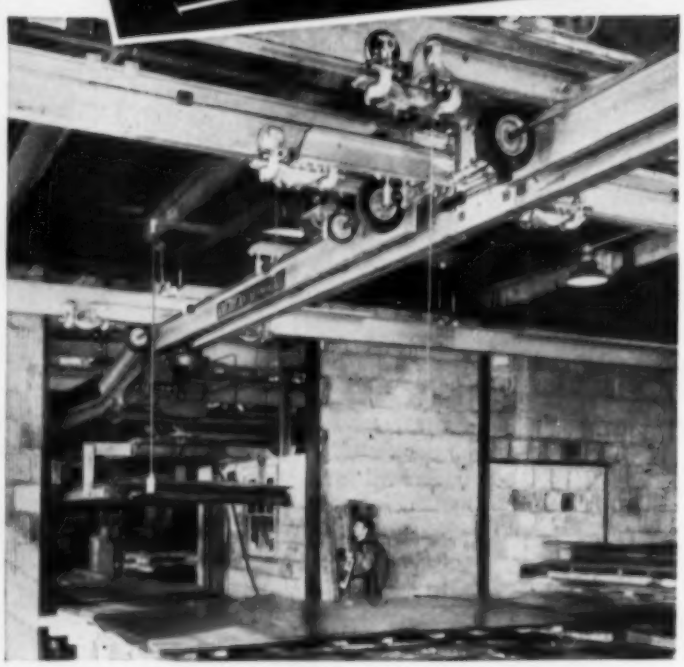
The Hamilton Steel Products Company of Chicago now handles 250 tons of sheet steel per day with American MonoRail cranes as compared to 50 tons by previous methods. An increase of 400%.

This is just another example of cost savings with improved handling methods which are regularly realized by American MonoRail users. If you have a materials handling problem call your American MonoRail representative or write us today.

Send for Bulletin SC-1.

Member of Materials Handling Institute and MonoRail Association



AMERICAN OVERHEAD HANDLING EQUIPMENT

AMERICAN MONORAIL COMPANY

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CLEVELAND 7, OHIO

[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]

Market Outlook

STEEL MILLS see pretty clearly that their high production will carry through the first quarter of next year. The second quarter looks promising, too.

The present quarter will continue to be one of capacity production. Order books guarantee this. With this quarter out of the way, steel company analysts are appraising 1957.

MIXED PATTERN— Demand for all forms of steel probably will not be equal. It's certain that more structural shapes, plates and some of the seamless tubing will be wanted than can be produced. Pressure for hot-rolled carbon sheet probably will continue strong. How much cold-rolled carbon sheet and how many cold-finished carbon bars will be wanted will depend to a large extent on the needs of the automobile industry, which is now changing models. How the new models will sell remains to be seen.

WHY THEY'LL BUY— Steel demand will depend primarily on consumption needs. Buying for inventory will be largely absent. Inventories of some forms of steel are believed to be substantial, and with the three-year contract of the steelworkers there will be no need to buy protectively against a steel strike. Other than to supply current needs, the two incentives to buy steel would be an impending price hike or a steel demand jump that would inspire users to expand their working inventories.

EASIER JOB— While as much steel may be turned out next year as will be produced this year, steel ingot production rates probably will not be as high. Next year's capacity will be larger than this year's, and the absence of a strike period would eliminate the need to race the rest of the year to make up for lost time. The industry, which will produce 114.5 million net tons of ingots this year, has operated above 95 per cent of capacity in all except the eight strike-affected weeks of 1956. On the basis of an anticipated Jan. 1, 1957, capacity of 132 million tons, the industry could turn out 114.5 million tons of ingots at a yearly average operating rate of 87 per cent.

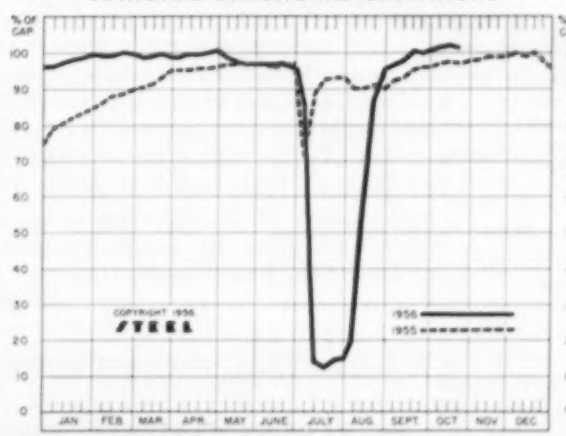
ABOVE CAPACITY— In the week ended Oct. 21, the national operating rate was 101.5 per cent of capacity. The preceding week's rate was 102 per cent. The fluctuation of half a point is insignificant.

Some of the steel producers would not object to a relaxed demand for steel in 1957 and 1958. A respite would give them an opportunity to obtain structural steel and machinery for their expansion programs. They want to be ready for the big steel demand expected about 1960 when family formations will increase.

WORKING AHEAD— Demand for structural steel is so strong that bridge builders can't promise deliveries on some of the larger projects until 1958. Public utilities, unable to get all the steel they needed this year, are inquiring for steel for the first half of 1957. They have stepped up their wants.

PRICES— Price steadiness prevails in the steel market. STEEL's price composite on finished steel holds at $137.48 a net ton. Its price composite on steelmaking scrap declined 33 cents—to $56.67 a gross ton.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Oct. 21	Change	Same Week 1955	Same Week 1954
Pittsburgh	102	+ 2*	102	71.5
Chicago	102	+ 0.5	97	79.5
Mid-Atlantic	101	+ 0.5	96.5	65
Youngstown	101	0	100	74
Wheeling	102.5	— 1.5	99	82
Cleveland	104.5	+ 1*	101.5	82
Buffalo	107.5	0	105	75.5
Birmingham	95.5	0	97.5	74
New England	85	+ 5	90	58
Cincinnati	93	— 2	86.5	70
St. Louis	103	— 3*	106	69.5
Detroit	101	0	98	82
Western	104	+ 1	102	60
National Rate	101.5	— 0.5	97	73

INGOT PRODUCTION‡

	Week Ended Oct. 21	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	155.6†	154.6	154.2	148.5
NET TONS (In thousands)	2,504†	2,483	2,477	2,386

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 39

Technical Outlook—p. 77

Bob Rossi, Chief Engineer, tells
Roy Johnson, Plant Manager

"We switched to Formbrite —and saved 12 cents apiece!"

.032" gage 70-30 Formbrite is used for this 4½" diameter rearview mirror head shown full size. Strip is 5$^{1}\frac{3}{32}$" wide supplied in heavy coils for long press runs. Copper, nickel and chromium plating on a solid brass base provides a bright, rustless, long-lasting outdoor finish.

Peerless Rearview Mirrors. "Flight-Wing," below, and the newer "Director" model, left. Housings and mounts are chromium-plated zinc-base die castings.

This easy-to-polish, superfine-grain drawing brass has been slashing finishing costs in plant after plant, on all kinds of jobs. Now Peerless Accessories Co., of Mount Holly, N. J., reports:

"To our line of lighting and safety automotive accessories, we've recently added two rearview mirror assemblies. We had been using regular drawing brass for the dished head until your representative persuaded us to try Formbrite. Here are the results, based on a very careful cost study:

Finishing procedure using regular drawing brass	Present procedure using Formbrite*
1) Grease grinding or "cutting"	Not necessary with Formbrite
2) Buffing	Light buff
3) Copper strike	Copper strike
4) Nickel plate (.00045")	Bright nickel plate (.0003")*
5) Buffing nickel	Not necessary
6) Chromium plate	Chromium plate
Cost 27¢ each	**Cost 15¢ each**

"That's a saving of 12 cents apiece. Multiply it by 3,000 to 4,000 a day and it becomes important money!"

*Formbrite's superfine grain made possible a lighter but equally serviceable plate of bright nickel

Surprisingly, Formbrite doesn't cost a penny more. Find out for yourself how its superfine grain, excellent drawing properties, strength, and scratch resistance can help you make a better product at lower cost. Write for Publication B-39. Better yet, ask us about a sample lot. The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

Formbrite FINE-GRAIN DRAWING BRASS

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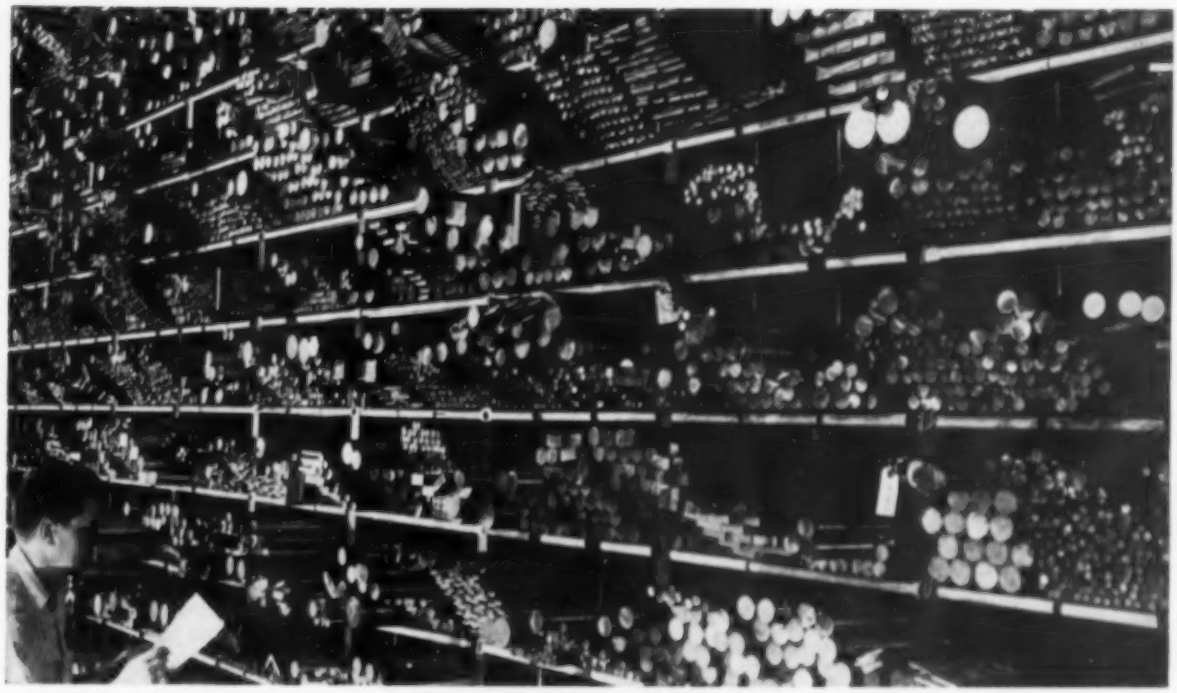


Fabricators would like to see more stocks like these at Armco Steel Corp., but the steel strike and unusually heavy demand have made bars scarce

H-R Bars Hard To Get

Shortage of large sizes will continue into 1957. Consumer acceptance of new autos will be determining factor in supply picture. Small sizes are easier to find

WHEN CARBON barmakers open order books for the first quarter, the news will bring little cheer to some metal-famished fabricators of "unusually popular" hot-rolled bars. They will discover that large bars will continue to be in short supply. But customers who sell cold-finished bars to automotive industries will be able to fill their needs easily.

Here's how one major bar manufacturer sizes up the loose-yet-tight supply picture: "In normal, peacetime years, there is not enough demand for large bars for us to increase capacity for 8-in. rounds, 6-in. flats or special bar sections. Now it is unusually heavy. In war years, large rounds are used for ordnance items, including shell manufacture. Peacetime buyers include large machinery manufacturers and forgers which serve auto makers. We have sufficient capacity to fill normal requirements of these industries, but 1956 hasn't been normal."

Equipment—Early this year, the need for mill machinery began to build up order backlogs for round bars larger than 4 in. Smaller sizes were in heavy demand, too, but many producers sell small hot-rolled bars, while only a handful produce larger sizes. Says one fabricator: "Only three principal suppliers roll carbon rounds larger than 7 in. Only four roll rounds larger than 6 in., while almost 20 mills roll them in 3½-in. up to 6 in. sizes."

A combination of events ended all hope for trimming the backlog of large unfilled bar orders in 1956. The summer steel strike forced most hot-rolled barmakers to turn down all orders for October delivery. Most producers also "blanked out" half of November order books. Demand for heavy machinery remained constant, while resumption of automotive production hiked requirements of forgers.

Future Needs—Looking to 1957, producers of large hot-rolled bars say the federal highway construction program will add to demands on their mills. In some major bar mills, the equipment will also be needed for rolling special sections going into bridge and culvert construction.

In smaller bar sizes, the supply situation runs from loose to tight. Alloy bar production is ample to meet dull demand from farm equipment builders and others. Suppliers of cold-finished bars to makers of automotive parts reported a slow third quarter, with sales gaining in the fourth. They can get the hot-rolled material they need. One Pittsburgh fabricator says his Detroit customers have such large inventories that his production will be at only 70 per cent of capacity in November.

Different Story—Many fabricators of small bars are hard

pressed for steel. They supply industries which have been too busy to build up a backlog, such as machine tool manufacturers. An eastern fabricator of hot-rolled bars says: "We order a popular small size, and our deliveries are eight weeks late. We're still waiting for some steel we were promised in August."

The same view is held by a large bolt and nut manufacturer in Ohio. The purchasing agent says: "We ran out of 1 in. bars two weeks ago, and we can't get more."

Not Chronic—Despite similar protests from other bar users, producers believe the shortage of smaller sizes will be short lived. It's a lingering effect of the steel strike. Barmakers already are beginning to cut down on their unfilled order backlog of smaller sizes. Shipments in November and December may be near normal.

All market observers agree that there's enough capacity to meet normal needs. According to the American Iron & Steel Institute, producers shipped 4,982,655 tons of hot-rolled bars (including light shapes) in the first half of 1956. In the corresponding period of 1955, they shipped 4,310,133 tons.

Look Ahead—Heavy first half production of bars helped to cut the order backlog, but the strike slashed second half output as much as 33 per cent—enough to prolong the bar shortage several months. Bar salesmen won't predict when large sizes will become easier to get. They believe that customers will fill first quarter order books quickly. After that, much will depend on customer acceptance of 1957 model automobiles. Any slowness in automotive ordering could help other customers, while active demand would extend the shortage well into 1957.

Steel Bars . . .

Bar Prices, Page 129

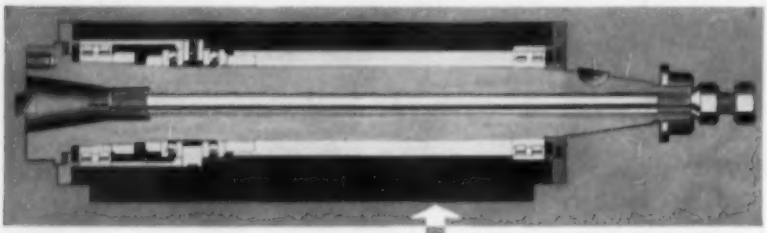
Some producers of hot-rolled carbon bars are booked up solidly over the remainder of this year. Others still can accept tonnage for December shipment.

Builders of machinery and heavy industrial equipment are specifying freely, but not much pressure is being exerted by converters. Nor are the fastener manufacturers pressing hard for tonnage, while automotive requirements continue to fall short of expectations.

In the Midwest, hot bar supplies have tightened noticeably, with stronger demand coming from virtually all consuming channels, except farm implements. Some area mills have a carry-over of three to four weeks, and there seems little likelihood they will reduce it by year end. Part of the congestion in mill schedules is due to heavy reinforcing bar demand.

The bar mills are preparing to open first quarter order books. One large maker of a list of diversified steel products has already opened for the period on all carbon products, except hot bars, preferring to hold off on that item as long as possible pending clarification of automotive needs.

Any appreciable spurt in auto specifying would be immediately reflected in a tightening up in the whole range of bar products.



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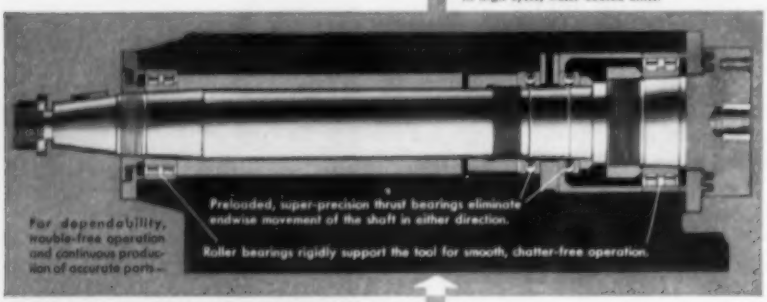
POPE Heavy Duty Milling Spindles are also available in P-2500 Series, MOTORIZED, from 1 to 100 HP, totally enclosed, fan cooled, and in high cycle, water cooled units.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361 RIVER STREET · HAVERHILL, MASSACHUSETTS

Tin Plate . . .

Tin Plate Prices, Page 131

Metal can shipments during the first eight months of this year totaled 3,207,748 tons, against 2,947,771 in the like 1955 period, reports the U.S. Census Bureau. August shipments of 594,695 tons jumped sharply over the July total of 448,559 tons, and exceeded the 565,102 reported for August, 1955.

The movement of fruit and vegetable cans in the first eight months was 1,025,293 tons against 925,694 in the same period last year. The August total was 305,999 tons, July's 156,350. The August, 1955, figure was 275,750.

Beer cans (second largest category) amounted to 557,684 tons during the first eight months, compared with 516,510 in the same 1955 period. The August movement was 81,795 tons, against 96,339 in July and 83,648 in August, 1955.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 130 & 131

While auto builders' specifications for cold-rolled sheets are not up to expectations for this quarter, the sheet mills are confident tonnage needs will be much heavier in November and December.

Generally, the mills are delaying opening their first quarter books until they can determine how heavy automotive needs will be. In turn, the auto builders are waiting for public reaction to their 1957 model cars. They have enough cold-rolled sheets in stock to care for immediate requirements.

Even without pressing automotive orders, sheetmakers are deluged with demand for hot-rolled sheets. In general, the hot-rolled sheets are scarce, while cold rolled are in relatively easy supply. On occasion, cold sheets have been accepted by consumers as a substitute for the scarce hot rolled.

Converters, warehouses and domestic tank fabricators have been actively pressing for hot sheets. Pressure from the jobbers reflects brisk demand from a widely diversified group of small consumers. While business is not at the level it was last spring, producers have all the hot-rolled business they can handle, and they are not doing too badly on cold rolled.

A Chicago area producer recently was in receipt of its first inquiry for conversion of wide hot-rolled sheets. This is seen as an indication that consumers are beginning to be concerned about supplies in the months ahead. Actually, the odds favor a sharp upturn in demand for cold-rolled sheets as the auto builders gain momentum in the production of 1957 models. Some sellers' rollings through November will be excellent, and December production will be at high level, especially if auto demand spurts.

Galvanized sheets are in relatively easy supply.

Granite City Steel Co., Granite City, Ill., has put into operation its first continuous galvanized line.

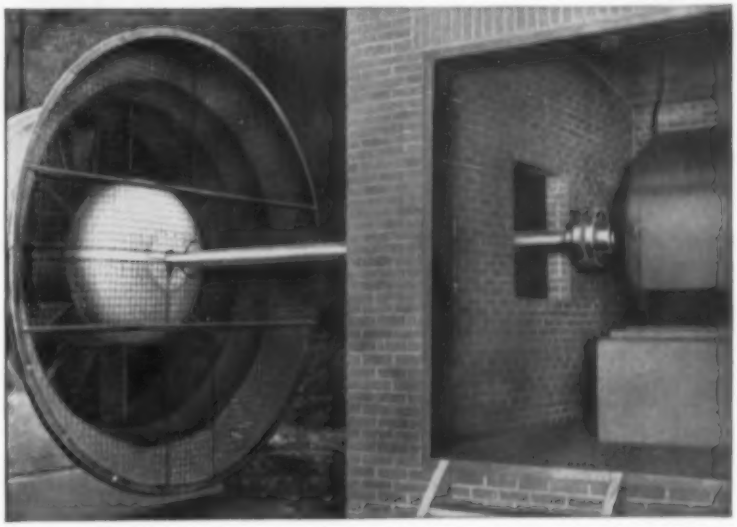
Stainless Steel . . .

Stainless Steel Prices, Page 133

Auto builders re-entered the market this quarter for stainless steel products, but a leading producer at Pittsburgh says purchases are not as heavy as had been expected.

Stainless sheet and plate produc-

Eliminate Intermediate Bearings!



By using Thomas Flexible Couplings on long, unsupported shafts, intermediate bearings are eliminated. Thomas engineers tubular shafts free from lateral whip.

The large fan shown above is 16' from the motor to allow sufficient air intake. Miners working underground receive their fresh air supply from this fan and others like it, which have been giving dependable service for as long as fifteen years . . . without shutdowns for lubrication or maintenance of the couplings.

Thomas floating shaft flexible couplings are recommended for machine and marine drives, printing presses, paper and cement mills, cooling towers, diesel engines, pumps, compressors, and many other uses.

Only Thomas Flexible Couplings offer *all* these advantages
UNDER LOAD and MISALIGNMENT

1. Freedom from Backlash—Torsional Rigidity
2. Free End Float
3. Smooth Continuous Drive with Constant Rotational Velocity
4. Visual Inspection in Operation
5. Original Balance for Life

. . . and

THOMAS ALL METAL COUPLINGS HAVE NO WEARING PARTS SO LUBRICATION AND MAINTENANCE ARE ELIMINATED

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THOMAS FLEXIBLE COUPLING COMPANY
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When you pay for premium material you expect premium performance—consistently. In TRU-STEEL **you get it**—consistently. Precision control of manufacturing processes, unsurpassed plant facilities, and the know-how of specialists whose only business is the manufacture of steel shot,—**assure it**. Tru-Steel is consistently round and solid, without hollow or stringy shot that reduce life cycle. Tru-Steel has the consistent hardness and chemistry from lot to lot that eliminates monthly variation in blasting costs. And,—it's superlatively graded; no other can match its uniformity.

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STEEL SHOT PRODUCERS, Inc.

Butler, Pa.

Subsidiary of Pittsburgh Crushed Steel Co
Pittsburgh 1, Pa.

Sold and recommended by
Pangborn Corporation, Hagerstown, Md.

tion will hold at capacity levels the rest of this year. This is because requirements are heavy from virtually all major consuming lines. Stainless strip and bars are moving slowly.

Demand for cold-rolled strip from the auto industry is disappointing.

Wire . . .

Wire Prices, Pages 131 & 132

Wire products, both merchant and manufacturers grades, are among steel products in the relatively easy to get category. Demand isn't as robust for them as it is for plates, shapes, line pipe and hot-rolled sheets.

October orders are reported to be up slightly in New England. But consumers of manufacturers, heading and other wire products used in the production of industrial goods are not buying ahead. The mills' November schedules are filling slowly, and most producers have caught up with overdue shipments.

Buying by screw manufacturers is spotty—it's close to the rate of consumption. Competition is keen among producers of this class fastener.

Demand for wire rods is holding up. Most users would take in additional tonnage if it were possible. Automotive demand for new model assemblies is gradually picking up. This is noticeable in automotive upholstery wire at St. Louis, where the volume being sought is equal to that placed a year ago.

Wire fabric for road building is moving at slower pace. This is a seasonal development. Fabric for reinforcement is in strong demand, as is fabric for concrete pipe.

Jones & Laughlin Steel Corp., Pittsburgh, has been licensed by Steel Co. of Canada Ltd. to produce and market the Ardox spiral nail in the U.S. It will sell at a lower price per nail than the common smooth shank type.

The largest inquiry for nails to come out in some time from the General Stores Supply Office, Navy, Philadelphia, calls for 1035 tons. Biggest item: 913 tons are nailing machine box nails, diamond point, cement coated. The Navy Purchasing Office, Washington, also is closing on 2.5 million ft of 5/16-in., 6 x 7, wire rope on Nov. 4.

Tubular Goods . . .

Tubular Goods Prices, Page 133

Tubemakers have opened their first quarter order books for oil country goods. Response from customers is good, despite the anticipated normal slowdown in well drilling over the winter months.

It's apparent, say Pittsburgh area producers, that the well drillers allowed their stocks to decline over recent months, and they are anxious to build them up again before summer.

First quarter orders for most other tubular goods are not being taken. Fourth quarter books are full in most items, and there will be substantial carry-overs. Mechanical tubing demand reflects the sluggishness in automotive requirements. Orders from that industry are picking up.

New England distributors' seamless pipe stocks are low. They are placing new orders with the mills, including direct shipment tonnage, and this means a first quarter carry-over is being built. The mills have not formally opened books for the first quarter.

Shortages of freight cars are hampering eastern shipments from midwest mills. Buttweld pipe deliveries are more extended. In some cases, third quarter shipments have not been received.

Production of mechanical and pressure tubing held up pretty well this summer. Some tonnage is available for delivery late this quarter. But alloy pipe deliveries extend into the first quarter and ratings are required to get stainless tonnage.

Having failed to get their full pipe requirements this year, public utilities are inquiring for their first half, 1957, needs, which involve heavier tonnage.

Warehouse . . .

Warehouse Prices, Page 134

Distributors anticipate a larger volume of business this month than they had in September. Not only are there a greater number of working days, but there is a likelihood that daily average bookings will be higher. Some distributors say their daily business already is surpassing that of a month ago.

Plates and shapes are in par-

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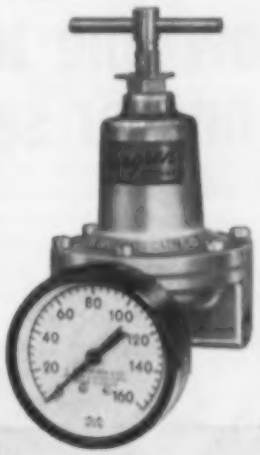

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All air-operated equipment is designed to operate most efficiently at one specified air pressure. Pressures in excess of this specified pressure result in greater wear, more downtime, higher maintenance cost and waste of air. You can select a Norgren Regulator that will provide the desired pressure at all times, holding it constant even though the line pressure or rate of flow may vary.

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1. PRECISION CONSTRUCTION
Norgren Pressure Regulators are precision built throughout to provide accurate pressure regulation under the most rugged conditions.

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Norgren Pressure Regulators respond quickly to sudden demands for greater air volume without an excessive momentary pressure drop.

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A baffle plate and siphon tube permits greater air flow with less pressure drop and protects the diaphragm against sudden pressure surges and chatter.

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The diaphragm in Norgren Pressure Regulators is made of oil-resistant synthetic rubber reinforced with nylon fabric.

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The built-in relieving feature available on all models safeguards connected equipment against damage through pressure surges—permits downward adjustment of pressure without auxiliary "bleeding" of line.

6. EASY TO INSTALL
Pipe connections are straight through for easy installation. In addition, most models can be completely dismantled without removing them from the air line.

Without obligation, learn how Norgren Pressure Regulators can reduce costs in your plant. Call your nearby Norgren Representative listed in your telephone directory, or **WRITE THE FACTORY FOR NEW NO. 700 CATALOG.**

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Wherever Air is Used in Industry

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NORGREN AIR PRESSURE REGULATORS, RELIEVING

Relieving feature provides added protection against excessive pressure build-up. Permits downward adjustment of pressure without "bleeding" of line. Maximum allowable primary pressure is 400 psi; adjustable delivery pressure is 2 to 250 psi. Pipe sizes—⅛" to 1" inclusive. Series 2AX.

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For precise control of air pressure in the range of 0 to 2 cfm. Specially suited for use with air-controlled instruments. Maximum allowable primary pressure is 400 psi; adjustable delivery pressure is 1 to 30 psi. Relieving type. Pipe size—¼". Series 11,400.

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Now one man can PUSH-BUTTON-OPERATE one or several Dempster-Balesters!

1

2

3

ONE PRESS may be the Dempster-Balester Model 129. Another the Model 351. Another the Model 701, etc. Each may be the same model, or there may be several of one model, one of another. In addition, one or all may be fully equipped with exclusive Dempster-Balester Auxiliary-Compression Door that enables you to bale in a 1-2-3 continuous cycle. This Auxiliary-Compression Door does not "beat" or "tamp" the scrap. It actually penetrates into the charging box, hydraulically compressing the scrap with a 45-ton force!

Do you need one Dempster-Balester or several? What model? With or without Auxiliary-Compression Door? With or without push-button control panel? Should your press produce one particular size bale, or be equipped to produce different size bales? Isn't it time we got together? Tremendous savings are yours with the right press, properly engineered and equipped to meet your particular requirements. Ask us to give you complete information. *A product of Dempster Brothers, Inc. Sold in Canada by the W. P. Favorite Co., Ltd., 418 Main Street East, Hamilton, Ontario.*

DEMPSTER BALESTER®

Photo 1 shows push-button controlled Skip Pan loaded. Photo 2 shows it dumping scrap metal into charging box. When Skip Pan returns to be re-loaded, Charging Box Door moves out, pushing last bale forward, clear of charging box (see Photo 3). Bale ejector returns to lowered position. Pusher heads (rams) proceed to bale the scrap and then automatically retract. Charging Box Door opens, bale is ejected and Skip Pan, which has been re-loaded, is ready to dump another load into box for baling.

DEMPSTER BROTHERS, 6106 Dempster Bldg., Knoxville 17, Tennessee

ticularly heavy demand, with hot-rolled sheets not far behind. Activity in hot-rolled carbon bars is brisk. Demand remains strong for items used in mill equipment manufacture and construction. Sheet demand is leveling off, because most users can order what they want through mill channels. Prices are steady.

A freight car shortage is reported by distributors in the Pittsburgh district.

September Steel Rate Soars

September output of 10,445,000 net tons of ingots and steel for castings set a record for the month, reports the American Iron & Steel Institute. It compares with 8,122,597 tons in August and 9,882,325 in September a year ago. This was the sixth month this year in which production exceeded 10 million tons.

Production totaled 82,796,932 net tons in the first nine months, against 85,784,118 in the comparable 1955 period. Third quarter output was 20,189,760 tons, against 30,735,158 in the second quarter and 28,577,816 in the like quarter of last year.

During September, the nation's steelmaking furnaces operated at an average of 99 per cent of the Jan. 1, 1956, capacity, rated at 128,363,090 net tons annually. This compared with 74.5 per cent in August. The average for the first nine months was 85.9 per cent; in the third quarter it was 62.4 per cent.

Plates . . .

Plate Prices, Page 129

It's still the same old story on plates—far more demand than the mills can readily satisfy.

This doesn't necessarily mean the producers will enter the first quarter of next year with heavy carry-overs. Most of them have been cautious in accepting new orders, so the chances are good that arrearages will run no more than two to three weeks.

Most platemakers are beginning to open order books for the first quarter on nonrated work. In planning allotments for the period, it is estimated rated work set-asides will be up about 20 per cent. This means rated tonnage will account for about 10 per cent of capacity, compared with 8 per cent in the current quarter. In alloy plates, the percentage will be still greater.

Sellers anticipate a sharp upswing in highway construction needs in 1957, including plates for bridges and culverts, and for heavy roadbuilding equipment. Adding to demand will be freight car construction requirements, and tonnage needed for mill equipment work deferred from 1956 because of strikes and material shortages. Tankwork, along with pipe fabrication, heavy industrial equipment building and construction will continue at high level.

Fabricating shops are operating on small steel inventories. Deliveries are most extended in heavy plates, ½-in. and thicker. More light gage tonnage is expected from the continuous mills, including some conversion plates.

A large water tank fabricator thinks demand is over the peak for the present. This applies particularly to government work, city and state.

Structural Shapes . . .

Structural Shape Prices, Page 129

There is far more demand for structural steel than the mills can promptly meet. Still, the position of producers is somewhat better than it was. The structural shortage has diverted considerable building to other types of construction, such as reinforced concrete.

This permits the shape mills to concentrate on clearing away the heavy order backlogs that have accumulated over recent months.

In the East, the position of mills for wide flange sections is noticeably better than it is for standard shapes. Contributing to this situation has been the shift in design of various projects to take more standard structurals. Another factor is the expansion in capacity for producing wide flange sections.

Although considerable construction and bridgework have been redesigned for reinforced and prestressed concrete building, demand for fabricated structural steel exceeds supply in New England. Shops are extended on commitments, and, unless tonnage is of a long-term nature, inquiries bring out a decreasing number of estimates.

Shop deliveries are heavier, but they are against old orders. Steel inventories are low, and most fab-

	—OPEN HEARTH—		—BESSEMER—		—ELECTRIC—		——TOTAL——	
Period	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity	Net tons	Per cent of capacity
1956								
January ..	9,676,151	101.4	323,235	79.5	828,845	86.7	10,828,231	99.3
February .	9,043,064	101.3	296,543	78.0	779,388	87.1	10,118,995	99.2
March	9,795,383	102.7	310,060	76.3	819,465	85.7	10,924,788	100.2
1st Qtr. ..	28,514,478	101.8	929,838	77.9	2,427,698	86.5	31,872,014	99.6
April	9,437,945	102.2	306,388	77.9	779,452	84.2	10,523,785	99.7
May	9,370,167	98.2	297,990	73.3	822,219	88.0	10,490,376	96.2
*June	8,665,044	93.9	282,846	71.9	773,546	83.6	9,721,436	92.1
*2nd. Qtr. .	27,473,156	98.1	887,224	74.3	2,375,217	84.6	30,735,597	96.0
*1st 6 Mo	55,987,634	100.0	1,817,062	76.1	4,802,915	85.6	62,607,611	97.8
July	1,330,151	13.9	.....	...	292,012	30.5	1,622,163	14.9
*August ..	7,213,274	75.6	189,564	46.6	719,758	75.3	8,122,597	74.5
†September.	9,369,000	101.5	287,000	72.9	789,000	85.3	10,445,000	99.0
†3rd Qtr. .	17,912,425	63.3	476,564	39.5	1,800,771	63.5	20,189,760	62.4
†9 Mos. ..	73,899,620	87.6	2,293,626	63.8	6,603,686	78.1	82,796,932	85.9
1955								
January ..	8,054,345	86.0	199,239	49.0	584,162	43.6	8,837,736	82.7
February .	7,734,334	91.8	197,091	53.7	564,959	44.1	8,496,934	88.0
March	9,060,026	96.7	255,493	62.6	666,235	72.6	9,981,754	93.4
1st Qtr. ..	24,849,255	91.4	651,813	55.2	1,815,356	68.1	27,316,424	88.0
April	8,858,049	97.7	275,069	69.8	681,477	76.6	9,815,095	94.8
May	9,307,291	99.4	305,347	75.1	715,678	77.9	10,328,316	96.6
June	8,784,430	96.6	283,544	72.0	698,493	78.6	9,746,467	94.1
2nd Qtr. ..	26,939,270	97.9	863,960	72.3	2,095,648	77.7	29,889,878	95.2
1st 6 Mos.	51,779,525	94.7	1,515,773	63.8	3,911,004	72.9	57,206,302	91.6
July	8,332,535	88.1	268,348	66.1	600,063	65.5	9,199,946	85.3
August ...	8,600,612	91.8	298,972	73.5	694,961	75.7	9,594,545	89.7
September .	8,829,266	97.6	307,171	78.2	745,888	84.1	9,882,325	95.7
3rd Qtr. ..	25,662,413	92.4	874,491	72.6	2,040,912	75.0	28,577,816	90.2
9 Mos. ...	77,441,938	93.9	2,390,264	66.8	5,951,916	73.6	85,784,118	91.1
October ...	9,369,704	100.0	330,150	81.2	801,196	87.3	10,501,050	98.2
November .	9,141,244	100.8	306,074	77.9	799,480	89.9	10,247,398	99.0
December .	9,406,531	100.7	292,429	72.1	804,559	87.8	10,503,519	98.5
4th Qtr. ..	27,917,479	100.5	929,253	77.0	2,405,235	88.3	31,251,967	98.6
Last Half .	53,579,892	96.5	1,803,744	74.8	4,446,147	81.7	59,829,783	94.4
Total 1955	105,359,417	95.6	3,319,517	69.3	8,357,151	77.3	117,036,085	93.0

Note—The percentages of capacity operated are calculated on weekly capacities in 1956 of 2,134,144 net tons open hearth, 91,810 net tons bessemer and 215,939 net tons electric ingots and steel for castings, total 2,461,893 net tons; based on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128,363,090 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.

*Revised. †Preliminary figures subject to revision

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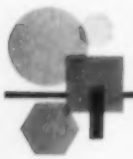

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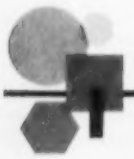

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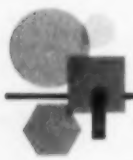

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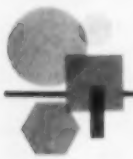

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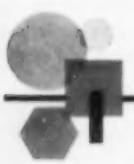


HOME OFFICE:

WHEELOCK, LOVEJOY & COMPANY, INC.

131 Sidney Street, Cambridge 39 Massachusetts

ricating shops are behind schedule. Bridge builders now more generally specify 1958 where the tonnage and fabricated work involved are substantial.

Chicago area mills are fully committed on structural shapes and plates for the rest of this year. One producer which has been doing some conversion of these two products also is sold out on this accommodation for the fourth quarter. It already has arranged to do conversion of shapes in the first quarter.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3750 tons, superstructure, Long Creek bridge, connection with relocation, highway 87, Table Rock dam, Branson, Mo., U.S. Corps of Engineers, Little Rock, Ark., to Stupp Bros. Bridge & Iron Co., St. Louis.

1400 tons, plant Alpha Portland Cement Co., Lime Kiln, Md., through MacDonald Engineering Co., Chicago, to Belmont Iron Works, Eddystone, Pa.

850 tons, Montana state Yellowstone river bridge, reported to Pittsburgh-Des Moines Steel Co.; general contract awarded at $923,480.

630 tons, Plain Edge high school, Bethpage, N. Y., through Paul J. Rocke Inc., general contractor, to Grand Iron Works, New York.

400 tons, institution, General State Authority, Luzerne, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

300 tons, San Betram steam electric station, Houston Power & Light Co., Strang, Tex., through Ebasco Services, to Mosher Steel Co., Houston.

390 tons, state bridge work, Suffolk county, New York, through Horn Construction Co. to Bethlehem Steel Co., Bethlehem, Pa.

200 tons, bridge and approach over railroad, Putnam, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Westcott Construction Co., North Attleboro, Mass., general contractor; reinforcing bars, Plantation Steel Co., Providence, R. I.

120 tons, addition, polymide unit, Firestone Tire & Rubber Co., Pottstown, Pa., to Cantley & Co., Philadelphia.

STRUCTURAL STEEL PENDING

5750 tons, 28-story glass-walled office building, Corning Glass Works, southeast corner 5th Ave. and 56th St., New York; Harrison & Abramovitz, New York, architects; building is scheduled for occupancy in late 1958.

5200 tons, power house, Indiana-Michigan Electric Co., Fairbanks township, Indiana; bids being asked by the American Gas & Electric Service Co., New York.

4000 tons, power plant addition Appalachian Power Electric Co., Glasgow, W. Va.; bids being taken through the American Gas & Electric Service Co., New York.

2400 tons, including penstocks and gates, Hartwell reservoir dam, Hartwell, Ga.; bids to Corps of Engineers, Savannah, Ga.; also 2500 tons of reinforcing steel.

2100 tons, bridge superstructure, Merrimack river, North Andover-Metheun, Mass.; bids in.

1350 tons, spillway gates, Ft. Gaines lock and dam, Ft. Gaines, Ga.; bids to Corps of Engineers, Mobile, Ala.

1000 tons, state institutional buildings, Beacon, N. Y.; bids asked.

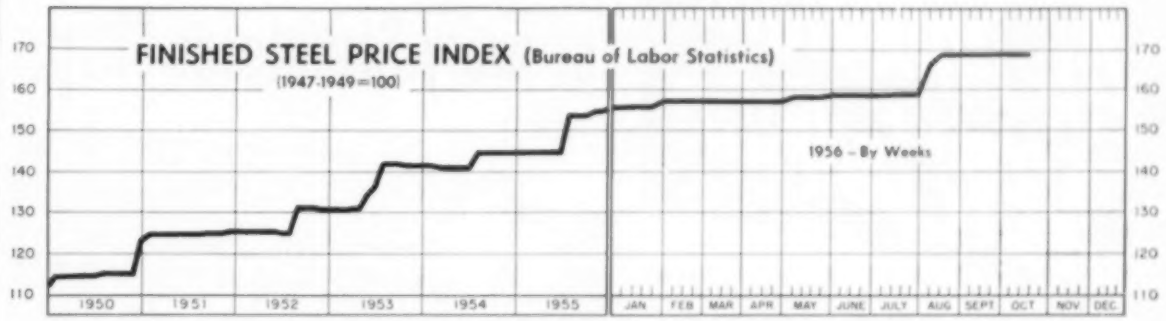
500 tons, including aluminum towers, switchyard, Barnhart Island power plant, near Massena, N. Y.; bids Oct. 25, New York State Power Authority; St. Lawrence contract No. P42.

450 tons, Holy Redeemer Hospital, Meadown Brook, Pa.; bids asked.

400 tons, three state bridges, Norwood-Westwood, Mass.; also three reinforced concrete

(*Please turn to page* 138)

Price Indexes and Composites



Oct. 16, 1956	Week Ago	Month Ago	Sept. Avg.	Year Ago
168.6	168.6	168.6	168.6	154.5

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 16

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.150	Bars, Reinforcing	5.738
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.610
Tie Plates	6.025	Bars, C.F., Alloy	13.275
Axles, Railway	5.950	Bars, C.F., Stainless, 302 (lb)	0.509
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.695
Plates, Carbon	5.550	Sheets, C.R., Carbon	6.639
Structural Shapes	5.267	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.480	Sheets, C.R., Stainless, 302 (lb)	0.635
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H. R. Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed W18 Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.025	Strip, H.R., Carbon	5.900
Bars, H.R., Stainless, 303 (lb)	0.483	Pipe, Black, Buttweld (100 ft)	16.376
Bars, H.R., Carbon	5.925	Pipe, Galv., Buttweld (100 ft)	22.516
		Pipe, Line (100 ft)	182.866
		Casing, Oil Well, Carbon (100 ft)	178.048
		Casing, Oil Well, Alloy (100 ft)	276.870
		Tubes, Boiler (100 ft)	45.033
		Tubing, Mechanical, Carbon (100 ft)	22.973
		Tubing, Mechanical, Stainless, 304 (100 ft)	187.133
		Tin Plate, Hot-dipped, 1.25 lb	9.333
		Tin Plate, Electrolytic, 0.25 lb	8.033
		Black Plate, Canmaking Quality	7.133
		Wire, Drawn, Carbon	9.175
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale ties (bundle)	7.213
		Nails, Wire, 8d Common	9.368
		Wire, Barbed(80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.865

STEEL's FINISHED STEEL PRICE INDEX*

	Oct. 17 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.58	225.58	225.71	208.90	171.82
Index in cents per lb	6.111	6.111	6.114	5.661	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel NT*	$137.48	$137.48	$137.75	$128.14	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	52.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	56.67	57.00	59.67	45.00	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Oct. 17 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld., Philadelphia	4.93	4.93	4.93	4.90	4.233
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	5.90	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std. Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.00	5.00	5.00	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrow Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.35	5.35	5.35	4.50	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C. R. Chicago	6.85	6.85	6.85	6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.25	4.85-5.10
Nails, Wire, Pittsburgh	8.20	8.20	8.35	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$9.85	$9.85	$9.85	$9.45	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$" Pitts.	5.80	5.80	5.80	5.025	4.10-4.30

PIG IRON, Gross Ton	Oct. 17 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld. Phila	66.26	66.26	66.26	62.16	56.61
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld. Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne	235.00†	235.00†	215.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$55.50	$56.50	$58.50	$44.50	$45.00
No. 1 Heavy Melt, E. Pa.	56.50	56.50	59.00	46.50	43.50
No. 1 Heavy Melt, Chicago	58.00	58.00	61.50	44.00	43.50
No. 1 Heavy Melt, Valley	63.50	64.50	65.50	48.00	45.00
No. 1 Heavy Melt, Cleve.	61.50	63.00	63.00	45.50	44.00
No. 1 Heavy Melt, Buffalo	57.50	57.50	56.50	38.50	44.00
Rails, Rerolling, Chicago	84.00	83.00	84.50	65.50	52.50
No. 1 Cast, Chicago	56.50	56.50	53.50	48.50	49.00

COKE, Net Ton					
Beehive, Furn. Connlsvl.	$14.50	$14.50	$14.50	$13.625	$14.75
Beehive, Fdry, Connlsvl.	17.50	17.50	17.50	16.50	17.50

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THOMAS
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Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company. Key to producers page 130; to footnotes, page 132.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$70.50

INGOTS, Alloy (NT)
Detroit R7 ....$74.00
Houston S5 ....74.00
Midland,Pa. C18 ....74.00
Munhall,Pa. U5 ....74.00

BILLETS, BLOOMS & SLABS Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$74.00
Bessemer,Pa. U5 ....74.00
Bridgeport,Conn. N19 ..79.00
Buffalo R2 ....74.00
Clairton,Pa. U5 ....74.00
Ensley,Ala. T2 ....74.00
Fairfield,Ala. T2 ....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 ....74.00
Johnstown,Pa. B2 ....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 ....80.00
Munhall,Pa. U5 ....74.00
Pittsburgh J5 ....74.00
S.Chicago,Ill. R2, U5 ..74.00
S.Duquesne,Pa. U5 ....74.00
Sterling,Ill. N15 ....74.00
Youngstown R2 ....74.00

Carbon, Forging (NT)
Aliquippa,Pa. J5 ....$91.50
Bessemer,Pa. U5 ....91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 ....91.50
Canton,O. R2 ....94.00
Clairton,Pa. U5 ....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 ....91.50
Fairfield,Ala. T2 ....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 ....91.50
Geneva,Utah C11 ....91.50
Houston S5 ....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2 ..91.50
LosAngeles B3 ....101.00
Midland,Pa. C18 ....91.50
Munhall,Pa. U5 ....91.50
Pittsburgh J5 ....91.50
Seattle B3 ....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ...101.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$107.00
Bridgeport,Conn. N19 .107.00
Buffalo R2 ....107.00
Canton,O. R2 ....107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 ....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 ....107.00
Houston S5 ....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2 .107.00
LosAngeles B3 ....127.00
Massillon,O. R2 ....107.00
Midland,Pa. C18 ....107.00
Munhall,Pa. U5 ....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ..107.00
Struthers,O. Y1 ....107.00
Warren,O. C17 ....107.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $116.50
Buffalo R2 ....111.50
Canton,O. R2 ....114.00
Cleveland R2 ....111.50
Gary,Ind. U5 ....111.50
S.Chicago,Ill. R2, W14 111.50
S.Duquesne,Pa. U5 ..111.50

SKELP
Aliquippa,Pa. J5 ....4.725
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 ....4.625
SparrowsPoint,Md. B2 .4.625
Warren,O. R2 ....4.625
Youngstown R2, U5 ..4.625

WIRE RODS
AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 ....5.80
Alton,Ill. L1 ....6.00
Buffalo W12 ....5.80
Cleveland A7 ....5.80
Donora,Pa. A7 ....5.80
Fairfield,Ala. T2 ....5.80
Houston S5 ....6.05
IndianaHarbor,Ind. Y1 .5.80
Johnstown,Pa. B2 ....5.80
Joliet,Ill. A7 ....5.80
KansasCity,Mo. S5 ....6.05
Kokomo,Ind. C16 ....5.90
LosAngeles B3 ....6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P7 ....5.80
N.Tonawanda,N.Y. B11 .5.80
Pittsburg,Calif. C11 ....6.45
Portsmouth,O. P12 ....5.80
Roebling,N.J. R5 ....5.90
S.Chicago,Ill. R2 ....5.80
SparrowsPoint,Md. B2 .5.90
Sterling,Ill.(1) N15 ....5.80
Sterling,Ill. N15 ....5.90
Struthers,O. Y1 ....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 ....5.00
Aliquippa,Pa. J5 ....5.00
Bessemer,Ala. T2 ....5.00
Bethlehem,Pa. B2 ....5.05
Birmingham C15 ....5.30
Clairton,Pa. U5 ....5.00
Fairfield,Ala. T2 ....5.00
Fontana,Calif. K1 ....5.70
Gary,Ind. U5 ....5.00
Geneva,Utah C11 ....5.00
Houston S5 ....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 ....5.05
KansasCity,Mo. S5 ....5.10
Lackawanna,N.Y. B2 ....5.05
LosAngeles B3 ....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 ....5.00
Niles,Calif. P1 ....5.75
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 ....5.80
Seattle B3 ....5.75
S.Chicago,Ill. U5, W14 .5.00
S.SanFrancisco B3 ....5.65
Sterling,Ill. N15 ....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 ....5.00

Wide Flange
Bethlehem,Pa. B2 ....5.05
Clairton,Pa. U5 ....5.00
Fontana,Calif. K1 ....5.85
IndianaHarbor,Ind. I-2 .5.00
Lackawanna,N.Y. B2 ....5.05
Munhall,Pa. U5 ....5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 ....5.00

Alloy Std. Shapes
Clairton,Pa. U5 ....6.20
Gary,Ind. U5 ....6.20
Houston S5 ....6.30
Munhall,Pa. U5 ....6.20
S.Chicago,Ill. U5 ....6.20

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 ....7.35
Bessemer,Ala. T2 ....7.35
Bethlehem,Pa. B2 ....7.40
Clairton,Pa. U5 ....7.35
Fairfield,Ala. T2 ....7.35
Fontana,Calif. K1 ....8.05
Gary,Ind. U5 ....7.35
Geneva,Utah C11 ....7.35
Houston S5 ....7.45
Ind.Harbor,Ind. I-2, Y1 7.35
Johnstown,Pa. B2 ....7.40
KansasCity,Mo. S5 ....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 ....8.05
Munhall,Pa. U5 ....7.35
Seattle B3 ....8.10
S.Chicago,Ill. U5, W14 ..7.35
S.SanFrancisco B3 ....8.00
Struthers,O. Y1 ....7.35

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ....7.40
Ind.Harbor,Ind. I-2 ....7.35
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 ....7.35
S.Chicago,Ill. U5 ....7.35

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.05
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 ....5.00
S.Chicago,Ill. U5 ....5.00

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....5.90
Lackawanna,N.Y. B2 ..5.90
Munhall,Pa. U5 ....5.90
S.Chicago,Ill. U5 ....5.90

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 ....4.85
Aliquippa,Pa. J5 ....4.85
Ashland,Ky. (15) A10 ..4.85
Bessemer,Ala. T2 ....4.85
Bridgeport,Conn. N19 ..4.75
Clairton,Pa. U5 ....4.85
Claymont,Del. C22 ....5.35
Cleveland J5, R2 ....4.95
Contesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..4.90
Detroit M1 ....4.60
Ecorse,Mich. G5 ....4.95
Fairfield,Ala. T2 ....4.85
Fontana,Calif.(30) K1 ..5.55
Gary,Ind. U5 ....4.85
Geneva,Utah C11 ....4.85
GraniteCity,Ill. G4 ....5.05
Harrisburg,Pa. P4 ....5.80
Houston S5 ....4.95
Ind.Harbor,Ind. I-2, Y1 4.85
Johnstown,Pa. B2 ....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 ....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 ....4.85
Newport,Ky. N9 ....4.85
Pittsburgh J5 ....4.85
Riverdale,Ill. A1 ....4.85
Seattle B3 ....5.75
Sharon,Pa. S3 ....4.85
S.Chicago,Ill. U5, W14 ..4.85
SparrowsPoint,Md. B2 ..4.85
Steubenville,O. W10 ..4.85
Warren,O. R2 ....4.85
Weirton,W.Va. W6 ....4.85
Youngstown R2, U5, Y1 4.85

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....6.20
Fontana,Calif. K1 ....6.70
Geneva,Utah C11 ....6.00
Johnstown,Pa. B2 ....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron
Economy,Pa. B14 ....11.128

PLATES, High-Strength Low-Alloy
Aliquippa,Pa. J5 ....7.25
Bessemer,Ala. T2 ....7.25
Clairton,Pa. U5 ....7.25
Claymont,Del. C22 ....7.55
Cleveland J5, R2 ....7.25
Coatesville,Pa. L7 ....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 ....7.35
Fairfield,Ala. T2 ....7.25
Fontana,Calif.(30) K1 ..7.95
Gary,Ind. U5 ....7.25
Geneva,Utah C11 ....7.25
Houston S5 ....7.35
Ind.Harbor,Ind. I-2, Y1 7.25
Johnstown,Pa. B2 ....7.25
Munhall,Pa. U5 ....7.25
Pittsburgh J5 ....7.25
Seattle B3 ....8.15
Sharon,Pa. S3 ....7.25
S.Chicago,Ill. U5, W14 ..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 ....7.25
Youngstown U5, Y1 ....7.25

PLATES, Alloy
Bridgeport,Conn. N19 ..6.55
Claymont,Del. C22 ....6.85
Coatesville,Pa. L7 ....6.85
Fontana,Calif.(30) K1 ..7.55
Gary,Ind. U5 ....6.85
Houston S5 ....6.95
Ind.Harbor,Ind. Y1 ....6.85
Johnstown,Pa. B2 ....6.85
Munhall,Pa. U5 ....6.85
Newport,Ky. N9 ....6.85
Seattle B3 ....7.75
Sharon,Pa. S3 ....6.85
S.Chicago,Ill. U5, W14 ..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 ....6.85

FLOOR PLATES
Cleveland J5 ....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 ....6.275
Ind.Harbor,Ind. I-2 ..5.925
Munhall,Pa. U5 ....5.925
S.Chicago,Ill. U5 ....5.925

PLATES, Ingot Iron
Ashland c.l. (15) A10 .5.10
Ashland l.c.l. (15) A10 .5.60
Cleveland c.l. R2 ....5.60
Warren,O. c.l. R2 ....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5 ..5.075
Alton,Ill. L1 ....5.275
Atlanta(9) A11 ....5.575
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ...5.375
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 ....5.075
Clairton,Pa. U5 ....5.075
Cleveland(9) R2 ....5.075
Ecorse,Mich.(9) G5 ...5.175
Emeryville,Calif. J7 ....5.85
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa.(9) U5 ...5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 ....5.075
Geneva(9) C11 ....5.175
Houston(9) S5 ....5.325
Ind.Harbor(9) I-2, Y1 5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 ....5.575
KansasCity,Mo.(9) S5 ..5.325
Lackawanna(9) B2 ....5.075
LosAngeles(9) B3 ....5.775
Midland,Pa.(9) C18 ...5.425
Milton,Pa.(23) M18 ...5.425
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 ....5.85
N.T'wands,N.Y.(9)B11 5.075
Pittsburg,Calif.(9) C11 5.775
Pittsburgh(9) J5 ....5.075
Portland,Oreg. O4 ....5.85
Seattle B3, N14 ....5.825
S.Ch'e'go(9) R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 ..5.075
S.SanFran.,Calif.(9) B3 5.825
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 ....5.175
Struthers,O. Y1 ....5.075
Torrance,Calif.(9) C11 5.775
Weirton,W.Va.(9)W6 ..5.075
Youngstown(9) R2, U5 5.075

BARS, H.R. Loaded Alloy (Including leaded extra)
Warren,O. C17 ....7.125

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 ....6.125
Canton,O. R2 ....6.125
Clairton,Pa. U5 ....6.125
Detroit R7 ....6.125
Ecorse,Mich. G5 ....6.225
Fairless,Pa. U5 ....6.275
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 ....6.125
Houston S5 ....6.375
Ind.Harbor,Ind. I-2,Y1 6.125
Johnstown,Pa. B2 ....6.125
KansasCity,Mo. S5 ....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 ....7.175
Massillon,O. R2 ....6.125
Midland,Pa. C18 ....6.125
S.Chicago R2, U5, W14 6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 ....6.175
Warren,O. C17 ....6.125
Youngstown U5 ....6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy
Aliquippa,Pa. J5 ....7.425
Bessemer,Ala. T2 ....7.425
Bethlehem,Pa. B2 ....7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 ....7.425
Cleveland R2 ....7.425
Ecorse,Mich. G5 ....7.525
Fairfield,Ala. T2 ....7.425
Fontana,Calif. K1 ....8.125
LosAngeles B3 ....8.125
Pittsburgh J5 ....7.425
Seattle B3 ....8.175
S.Chicago U5, W14 ....7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 ....7.425
Youngstown U5 ....7.425

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.225
Lackawanna(9) B2 ....5.075
Sterling,Ill. N15 ....5.175
Sterling,Ill(1) N15 ..5.075

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ....5.075
Atlanta A11 ....5.575
Joliet,Ill. P22 ....5.10
Niles,Calif. P1 ....5.85
Pittsburgh J5 ....5.075
Portland,Oreg. O4 ....5.85
SanFrancisco S7 ....5.95

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. U5 ....6.20
Gary,Ind. U5 ....6.20
Houston S5 ....6.45
KansasCity,Mo. S5 ....6.45
Youngstown U5 ....6.20

BARS, C.F. Loaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ....9.225
Chicago W18 ....9.225
Cleveland C20 ....9.475
LosAngeles S30 ....11.10
LosAngeles P2 ....11.00
Monaca,Pa. S17 ....9.225
Newark,N.J. W18 ....9.40
Warren,O. C17 ....9.475

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....6.85
BeaverFalls,Pa. M12,R2 6.85
Bridgeport,Conn. N19 ..7.20
Buffalo B5 ....6.90
Camden,N.J. P13 ....7.30
Carnegie,Pa. C12 ....6.85
Chicago W18 ....6.85
Cleveland A7, C20 ....6.85
Detroit B5, P17 ....7.05
Detroit R7 ....6.85
Donora,Pa. A7 ....6.85
Elyria,O. W8 ....6.85
FranklinPrk,Ill. N5 ....6.85
Gary,Ind. U5 ....6.85
GreenBay,Wis. P7 ....6.85
Hammond,Ind. L2, M13 6.85
Hartford,Conn. R2 ....7.35
Harvey,Ill. B5 ....6.85
LosAngeles(49) S30 ....8.30
LosAngeles P2, R2 ....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ....6.85
Midland,Pa. C18 ....6.85
Monaca,Pa. S17 ....6.85
Newark,N.J. W18 ....7.30
NewCastle,Pa.(17) B4 ..6.85
Pittsburg J5 ....6.85
Plymouth,Mich. P5 ....7.10
Putnam,Conn. W18 ....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 ....6.85
SpringCity,Pa. K3 ....7.30
Struthers,O. Y1 ....6.85
Waukegan,Ill. A7 ....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 .6.10

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 ....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 ....8.325
Camden,N.J. P13 ....8.50
Canton,O. T7 ....7.425
Carnegie,Pa. C12 ....8.325
Chicago W18 ....8.325
Cleveland A7, C20 ....8.325
Detroit B5, P17 ....8.525
Detroit R7 ....8.325
Donora,Pa. A7 ....8.325
Elyria,O. W8 ....8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 ....8.325
GreenBay,Wis. P7 ....8.325
Hammond,Ind. L2,M13 8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 ....8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles P2, R30 ..10.10
Mansfield,Mass. B5 ....8.625
Massillon,O. R2, R8 ....8.325
Midland,Pa. C18 ....8.325
Monaca,Pa. S17 ....8.325
Newark,N.J. W18 ....8.50
Plymouth,Mich. P5 ....8.525
S.Chicago W14 ....8.325
SpringCity,Pa. K3 ....8.50
Struthers,O. Y1 ....8.325
Warren,O. C17 ....8.325
Waukegan,Ill. A7 ....8.325
Worcester,Mass. A7 ....8.625
Youngstown F3, Y1 ....8.325

BARS, Reinforcing (To Fabricators)
Ala.City,Ala. R2 ....5.075
Atlanta A11 ....5.575
Birmingham C15 ....5.375
Bridgeport,Conn. N19 ..5.30
Buffalo R2 ....5.075
Cleveland R2 ....5.075
Ecorse,Mich. G5 ....5.425
Emeryville,Calif. J7 ....5.85
Fairfield,Ala. T2 ....5.075
Fairless,Pa. U5 ....5.225

Ft.Worth,Tex.(42) T4 .5.525
Gary,Ind. U5 .....5.075
Houston B5 .....5.325
Ind.Harbor,Ind. I-2, Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.575
KansasCity,Mo. B5 ....5.325
Lackawanna,N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ..5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ...5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SandSprings,Okla. S5..5.575
Seattle B3, N14 .....5.825
S.Chicago R2 .....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2.5.075
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Torrance,Calif. C11 ...5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2.6.73
KansasCity,Kans. S5 ...6.825
Marion,O. P11 .....6.70
New York U8 .....7.18
Pittsburgh U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2.5.075
ChicagoHts.(4) I-2 ....5.075
ChicagoHts.(4) C2 .....5.65
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(4) F5 ....5.60
Franklin,Pa.(3) F5 ....5.10
JerseyShore,Pa.(4) J8 ..5.00
Marion,O.(3) P11 .....5.15
Moline,Ill.(3) R2 ....5.225
Tonawanda(3) B12 ....5.65
Tonawanda(4) B12 ....6.15
Williamsport,Pa.(3) S19.5.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 12.305
Economy,Pa.(D.R.)B14 15.301
Economy(Staybolt)B14 15.676
M&K.Rbs.(S.R.) L5 ... 17.15
M&K.Rbs.(D.R.) L5 18.00
M&K.Rbs.(Staybolt) L5 19.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.675
Allenport,Pa. P7 .....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 ....4.675
Conshohocken,Pa. A3..4.725
Detroit(8) M1 .....4.775
Dravosburg,Pa. U5....4.675
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.475
Gary,Ind. U5 .....4.675
Geneva,Utah C11 .....4.775
GraniteCity,Ill.(8) G4..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Lackawanna,N.Y. B2..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) N9 ..4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburg J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2..4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ....4.675
Youngstown U5, Y1 ..4.675

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg,Pa. U5 ....7.75
Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ...7.75
Newport,Ky. N9 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Dravosburg,Pa. U5 ....6.90
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6.95
Fontana,Calif. K1 .....7.70
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Lackawanna(37) B2 ...8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1.....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky.	A10.6.65	6.90
Canton,O.	R2 ..6.65	7.15
Dravosburg	U5 ..6.65	6.90
Fairfield	T2 ....6.65	6.90
Gary,Ind.	U5 ...6.65	6.90
Ind.Harbor	I-2 ..6.65	6.90
Kokomo,Ind.	C16.6.75	...
MartinsFry.	W10.6.65	...
Pitts.,Calif.	C11..7.40	...
SparrowsPt.	B2..6.65	...

SHEETS, Culvert—Pure Iron

Dravosburg U5 .....6.90
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 .....6.30‡
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30‡
Dravosburg,Pa. U5 ...6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
Granite City,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ..6.30†
Kokomo,Ind. C16 .....6.40‡
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ...6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana,Calif. K1 ....6.975

SHEETS, Cold-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10...4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ...4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ...5.80
Dravosburg,Pa. U5 ....5.75
Detroit M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 .....6.95
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Lackawanna,N.Y. B2 ...5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. N9 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 .....8.525
Dravosburg,Pa. U5....8.575
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.725
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1.8.525
Lackawanna(37) B2 ...8.525
Pittsburgh J5 .....8.525

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg,Pa. U5 ...9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Dravosburg,Pa. U5 ....6.70
Kokomo,Ind. C16 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland(28) R2 ....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg,Pa. U5 ....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ...8.175
Yorkville,O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 PacificStatesSteelCorp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W.Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	4.975
Bridgeport Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.475
Gary Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance Calif. C11	5.425
Warren,O. R2	4.675
Weirton W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Dravosburg U5	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. N9	7.75
Sharon,Pa. S3	7.75
S.Chicago W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren O R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2 M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee W.Va. F4	6.85
Fontana,Calif. K1	8.60
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.80
NewBedford,Mass. R10	7.30
NewBr'tain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
SparrowsPt, Md. B2	6.25
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.55
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Lackawanna,N.Y. B2	9.10
Sharon,Pa. S3	10.00
SparrowsPoint,Md. B2	9.10
Warren,O. R2	10.00
Weirton,W.Va. W6	10.20
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.90	15.30	18.25
Boston T6	8.50	10.10	12.90	15.30	18.25
Bristol,Conn. W1	...	...	12.90	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.60	15.00	....
Cleveland A7	7.95	9.80	12.60	15.00	17.95
Cleveland C7	...	9.80	12.60	15.00	17.95
Dover,O. G6	7.95	9.80	12.60	15.00	17.95
Detroit D2	8.05	9.90	12.70	15.10	....
Dearborn,Mich. D3	8.05	9.90	12.70	....	....
FranklinPark,Ill. T6	8.05	9.80	12.60	15.00	17.95
Harrison,N.J. C18	...	...	12.90	15.30	18.25
Indianapolis C8	8.10	9.95	12.60	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.60	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.60	15.00	....
NewHaven,Conn. D2	8.40	10.10	12.90	15.30	....
NewKensington,Pa. A6	7.95	9.80	12.60	15.00	....
NewYork W3	...	10.10	12.90	15.30	18.25
Pawtucket R.I. N8	8.50	10.10	12.90	15.30	18.25
Riverdale,Ill. A1	8.05	9.80	12.60	15.00	17.95
Rome,N.Y.(32) R6	7.95	9.80	12.60	15.00	17.95
Sharon,Pa. S3	7.95	9.80	12.60	15.00	17.95
Trenton,N.J. R5	...	10.10	12.90	15.30	18.25
Wallingford,Conn. W2	8.40	10.10	12.90	15.30	18.15
Warren,O. T5	7.95	9.80	12.60	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.60	15.00	17.95
Worcester,Mass. A7, T6	8.50	10.10	12.90	15.30	18.25
Youngstown C8	7.95	9.80	12.60	15.00	17.95

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	16.80	20.65	....
Buffalo W12	16.80	....	....
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	16.80	20.65	25.00
NewYork W3	16.80	20.65	25.00
Palmer,Mass. W12	16.80	....	....
Trenton,N.J. R5	16.80	20.65	25.00
Worcester,Mass. W12	14.80	....	....
Worcester,Mass. A7, T6	16.80	20.65	25.00
Youngstown C8	17.15	21.00	25.35

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom W.Va. W10	...	...	11.00	12.05	13.05
Brackenridge,Pa. A4	...	...	11.00	12.05	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. N9	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville A10 (HP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS, (22 Ga.) Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	....	...	10.85†	11.525†	12.575† 13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

	Transformer Grade			
H.R. SHEETS (22 Ga., cut lengths)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge Pa. A4	....	16.90	18.50	19.00	19.50	14.05**
Butler,Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55†

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$8.30	$8.55	$8.95
Dravosburg,Pa. U5	8.30	8.55	8.95
Fairfield,Ala. T2	8.40	8.65	9.05
Fairless,Pa. U5	8.40	8.65	9.05
Fontana,Calif. K1	9.05	9.30	9.70
Gary,Ind. U5	8.30	8.55	8.95
GraniteCity,Ill. G4	8.40	8.65	9.05
IndianaHarbor,Ind. I-2, Y1	8.30	8.55	8.95
Niles,O. R2	8.30	8.55	8.95
Pittsburg,Calif. C11	9.05	9.30	9.70
SparrowsPoint,Md. B2	8.40	8.65	9.05
Weirton W.Va. W6	8.30	8.55	8.95
Yorkville,O W10	8.30	8.55	8.95

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	6.975	....	....
Niles,O. R2	7.425	7.625	7.825

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.60	$9.85
Dravosburg,Pa. U5	9.60	9.85
Fairfield,Ala. T2	9.70	9.95
Fairless,Pa. U5	9.70	9.95
Fontana,Calif. K1	10.35	10.60
Gary,Ind. U5	9.60	9.85
Ind.Harbor Y1	9.60	9.85
Pitts.,Calif. C11	10.35	10.60
Sp.Pt.,Md. B2	9.70	9.95
Weirton,W.Va. W6	9.60	9.85
Yorkville,O. W10	9.60	9.85

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.40
Dravosburg,Pa. U5	7.40
Fairfield,Ala. T2	7.50
Fairless,Pa. U5	7.50
Fontana,Calif. K1	8.15
Gary Ind. U5	7.40
GraniteCity,Ill. G4	7.50
Ind.Harbor,Ind. I-2, Y1	7.40
Niles,O. R2	7.40
Pittsburg,Calif. C11	8.15
SparrowsPoint,Md. B2	7.40
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburg,Pa. U5	$7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.10
Gary,Ind. U5	9.10

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary Ind. U5	$10.65

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth,Minn. A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7 P16	7.20
N.Tonawanda B11	7.20
Palmer-Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.20
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, M8 Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth,Minn. A7	8.725
Fostoria,O S1	8.775
Johnstown Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N6	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester J4	9.025
Worcester,Mass. A7, T6	9.025
Niles,O. R2	7.40
Pittsburg,Calif. C11	8.15
SparrowsPoint,Md. B2	7.50
Weirton,W.Va. W6	7.40
Yorkville,O. W10	7.40

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth Minn. A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville Ill. K4	14.25
Buffalo W12	14.15
Chicago W13	13.55
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill. A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE, Gal'd ACSR for Cores

Bartonville Ill. K4	11.75
Buffalo W12	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie Ind. I-7	11.95
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	11.85
Struthers,O. Y1	11.75

ROPE WIRE (A)

Bartonville Ill. K4	11.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.35
Roebling,N.J. R5	11.85
SparrowsPt, B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.25
Monessen,Pa. P16	14.45
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	10.75
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R5	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester A7, T6	11.05

NAILS, Stock

To Dealers & Mfrs.	Col.
AlabamaCity, Ala. R2	164
Aliquippa,Pa. (7) J5	167
Atlanta (7) A11	169
Bartonville,Ill. (7) K4	169
Chicago,Ill. (7) W13	167
Cleveland (7) A9	173
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth,Minn. A7	164
Fairfield,Ala. T2	164
Houston,Tex.(7) S5	172
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. (7) B2	169
Joliet,Ill. A7	164
KansasCity,Mo. (7) S5	172
Kokomo,Ind. (7) C16	169
Minnequa,Colo. (7) C10	172
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md.(7) B2	169
Sterling,Ill.(1) N15	*164*
Worcester,Mass. A7	170

(To Wholesalers; per cwt)

Galveston,Tex. D7 ... $8.75

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

STAPLES, Polished Stock

To Dealers & Mfrs.	Col.
AlabamaCity, Ala. R2	164
Aliquippa,Pa. (7) J5	167
Atlanta (7) A11	169
Bartonville,Ill. (7) K4	169
Crawfordsville,Ind.(7)M8	169
Donora,Pa. A7	164
Duluth,Minn. A7	164
Fairfield,Ala. T2	164
Jack'ville,Fla.(7)(20)M8	178
Johnstown,Pa. (7) B2	169
Joliet,Ill. A7	164
Kokomo,Ind. (7) C16	169
Minnequa,Colo. (7) C10	172
Monessen,Pa. (7) P7	167
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md.(7) B2	169
Sterling,Ill.(1) N15	*164*
Worcester,Mass. A7	170

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.53
Bartonville Ill. K4	10.13
Buffalo W12	10.05
Crawfordsville,Ind. M8	10.13
Donora,Pa. A7	9.53
Duluth,Minn. A7	9.53
Jacksonville,Fla. M8	10.58
Johnstown,Pa. B2	10.03
Joliet,Ill. A7	9.53
Kokomo,Ind. C16	10.13
LosAngeles B3	10.82
Minnequa,Colo. C10	10.28
Pittsburg,Calif. C11	10.31
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.81
SparrowsPt. Md B2	10.13
Sterling,Ill.(1) N15	*9.53*
Coil No. 6500 Stond.	
AlabamaCity,Ala. R2	$9.85
Bartonville,Ill. K4	10.45
Buffalo W12	10.35
Crawfordsville,Ind. M8	10.45
Donora,Pa. A7	9.85
Duluth Minn. A7	9.85
Jacksonville,Fla. M8	10.91
Johnstown, Pa.B2	10.35
Joliet,Ill. A7	9.85
Kokomo,Ind. C16	10.45
LosAngeles B3	11.15
Minnequa,Colo. C10	10.60
Pittsburg,Calif. C11	10.65
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	11.15
SparrowsPt.,Md. B2	10.45
Sterling,Ill.(1) N15	*9.85*

Coil Interim

AlabamaCity,Ala. R2	$9.90
Bartonville,Ill. K4	10.50
Buffalo W12	10.40
Crawfordsville,Ind. M8	10.50
Donora,Pa. A7	9.90
Duluth,Minn. A7	9.90
Jacksonville,Fla. M8	10.96
Johnstown,Pa. B2	10.40
Joliet,Ill. A7	9.90
Kokomo,Ind. C16	10.50
LosAngeles B3	11.20
Minnequa,Colo. C10	10.65
Pittsburg,Calif. C11	10.70
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	11.20
SparrowsPt.,Md. B2	10.50
Sterling,Ill.(1) N15	*9.90*

WIRE, Barbed	Col.
AlabamaCity,Ala. R2	184**
Aliquippa,Pa. J5	184†
Atlanta A11	193
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	193
Donora,Pa. A7	184†
Duluth,Minn. A7	184†
Fairfield,Ala. T2	184†
Houston,Tex. S5	192**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	191*
Joliet,Ill. A7	184†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Monessen,Pa. P7	191*
Pittsburg Calif. C11	204†
Rankin,Pa. A7	184†
S.Chicago,Ill. R2	184**
S.SanFrancisco C10	207**
SparrowsPoint,Md., B2	193*
Sterling,Ill.(1) N15	*188**

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	181**
Aliq'ppa,Pa. 9-14½ga.J5	184§
Atlanta A11	187
Bartonville,Ill. K4	187
Crawfordsville,Ind. M8	187
Donora,Pa. A7	176†
Duluth,Minn. A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. S5	186**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	185
Joliet,Ill. A7	176†
KansasCity,Mo. S5	186**
Kokomo,Ind. C16	183†
Minnequa,Colo. C10	186**
Monessen,Pa. 9 ga. P7	185*
Pittsburg Calif. C11	199†
Rankin,Pa. A7	176†
S.Chicago,Ill. R2	176**
Sterling,Ill.(1) N15	*180**

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	15.70	17.25**
Bartonville K4	16.10	18.05
Buffalo W12	16.10	....
Cleveland A7	15.70	17.25†
Crawf'dsville M8	16.20	18.15
Fostoria,O. S1	16.20	17.75†
Jacksonville M8	16.45	18.40
Johnstown B2	16.10	18.05*
Kokomo C16	16.20	17.75†
Minnequa C10	16.45	18.15**
P'im'r,Mass.W12	16.10	17.65*
Pitts.,Calif. C11	16.05	17.60†
SparrowsPt. B2	16.20	18.15*
Sterling(1) N15	16.10	18.05*
Waukegan A7	15.70	17.25†
Worcester A7	16.60	....

WIRE, Merchant Quality (6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.95	8.35**
Aliquippa J5	8.10	8.625§
Atlanta A11	8.20	8.80
Bartonville(48) K4	8.20	8.80
Buffalo W12	8.10	8.80†
Cleveland A7	7.95	....
Crawfordsville M8	8.20	8.80
Donora,Pa. A7	7.95	8.35†
Duluth,Minn. A7	7.95	8.35†
Fairfield T2	7.95	8.35†
Houston(48) S5	8.35	8.75**
Jacks'ville,Fla. M8	8.45	9.05
Johnstown B2(48)	8.10	8.70*
Joliet,Ill. A7	7.95	8.35†
Kans.City(48) S5	8.35	8.75**
Kokomo C16	8.20	8.60†
LosAngeles B3	9.05	9.65*
Minnequa C10	8.35	8.75**
Monessen P7 (48)	8.10	8.70*
Palmer,Mass. W12	8.40	8.80†
Pitts.,Calif. C11	8.90	9.30†
Portsmouth,O. P12	8.10	....
Rankin,Pa. A7	7.95	8.35†
S.Chicago R2	7.95	8.35**
S.SanFran. C10	9.05	9.45**
Spar'wsPt. B2(48)	8.20	8.80*
Sterling(1)(48)N15	*7.95*	*8.55**
Struth'rs,O.(48) Y1	8.10	8.60†
Worcester,Mass. A7	8.25	8.65†

Based on zinc price of: *13.50c. †5c. ‡10c. ‖Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop	Col.
AlabamaCity,Ala. R2	190
Atlanta A11	197
Bartonville Ill. K4	197
Crawfordsville,Ind. M8	197
Donora,Pa. A7	190
Duluth,Minn. A7	190
Fairfield,Ala. T2	190
Jacksonville,Fla. M8	202
Joliet,Ill. A7	190
Houston 85	200
KansasCity,Mo. 85	200
Kokomo,Ind. C16	197
Minnequa,Colo. C10	200
Pitts.,Calif. C11	214
S.Chicago,Ill R2	190
Sterling,Ill. N15	*190*
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	167
Duluth,Minn. A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	167
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Moline,Ill. R2	172
S.Chicago,Ill. R2	167
Sterling,Ill. N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)
½ in. and smaller:
6 in. and shorter 55
Longer than 6 in. 46.5
⅝ in. thru 1 in.:
6 in. and shorter 46.5
Longer than 6 in. 44
1¼ in. and larger:
All lengths 44
Undersized Body (rolled thread)
½ in. and smaller:
6 in. and shorter 55

Carriage, Machine, Lag Bolts Hot Galvanized:
½ in. and smaller:
6 in. and shorter 35
Longer than 6 in. 23
⅝ in. thru 1 in.:
6 in. and shorter 20
Longer than 6 in. 20
1¼ in. and larger:
All lengths 20

Lag Bolts
All diameters:
6 in. and shorter 55
Longer than 6 in. 47

Plow and Tap Bolts
½ in. and smaller by 6 in. and shorter 54
Larger than ½ in. or longer than 6 in. 47

Blank Bolts 47

Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:
All sizes 59

Square Nuts, Reg. & Heavy, Hot Galvanized:
All sizes 45

Hex Nuts, Reg. & Heavy, Hot Pressed:
⅝ in. and smaller .. 63
⅞ in. to 1 in. incl. 59.5
1⅛ in. to 1½ in., incl. 64
1⅝ in. and larger .. 58

Hex Nuts, Reg. & Heavy, Cold Punched:
⅝ in. and smaller.. 63
⅞ in. to 1½ in , incl. 59.5
1⅝ in. and larger.. 58

Hex Nuts, All Types, Hot Galvanized:
⅝ in. and smaller.. 50
⅞ in. to 1 in., incl. 46
1⅛ in. to 1½ in., incl. 51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):
⅝ in. and smaller.. 63
⅞ in. to 1½ in., incl. 59.5
1⅝ in. and larger.. 58

Hex Nuts, Finished (Incl. Slotted and Castellated):
1 in. and smaller ... 65
1⅛ in. to 1½ in., incl. 62
1⅝ in. and larger.. 58
(Base discounts, packages, per cent off list, f.o.b. mill)

CAP AND SET SCREWS

Hex Head Cap Screws, Coarse or Fine Thread Bright:
6 in. and shorter:
⅝ in. and smaller.. 47
¾, ⅞ and 1 in. diam. 31
Longer than 6 in.:
⅝ in. and smaller.. 18.5
¾, ⅞ and 1 in. diam. 55

High Carbon, Heat Treated:
6 in. and shorter:
⅝ in. and smaller.. 34
¾, ⅞ and 1 in. diam. 13
Longer than 6 in.:
⅝ in. and smaller.. +1
¾, ⅞ and 1 in. diam. .... +19

Fillister Head, Coarse Thread:
Listed Sizes .... +31

Flat Head, Coarse Head:
⅛ in. and smaller by 6 in. and shorter.. +57

Set Screws, Square Head, Cup Point, Coarse Thread:
Through 1 in. diam.:
6 in. and shorter .. 11
Longer than 6 in. .. +10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 10.85
7/16-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.68
1¼	13	26.34	30.86	25.98
1½	13	31.12	36.45	29.64
1¾	13	34.88	40.85	33.21
2	13	39.29	46.01	37.42
2¼	12	42.64	49.94	40.61
2¼	12	46.98	55.01	44.73
2½	12	50.86	59.57	48.44
2¾	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Toe Rails All No. 2	Toe Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield,Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W.Va. W7	....	....	....	6.15
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	...(16)	6.00
Lackawanna,N.Y. B2	5.075	4.975	...(16)	6.00
Minnequa,Colo C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.025
Gary,Ind. U5	6.025
Ind.Harbor,Ind. I-2	6.025
Lackawanna,N.Y. B2	6.025
Minnequa,Colo. C10	6.025
Seattle B3	6.175
Steelton,Pa. B2	6.025
Torrance,Calif. C11	6.175

TRACK BOLTS, Untreated

Cleveland R2	13.10
Lebanon,Pa. B2	13.10
Minnequa,Colo. C10	13.10
Pittsburgh P14	13.10
Seattle B3	13.60

AXLES

Ind.Harbor,Ind. S13	8.10
Johnstown,Pa. B2	8.10

JOINT BARS

Bessemer,Pa. U5	6.35
Fairfield,Ala. T2	6.35
Ind.Harbor,Ind. I-2	6.35
Joliet,Ill. U5	6.35
Lackawanna,N.Y. B2	6.35
Minnequa,Colo. C10	6.35
Steelton,Pa. B2	6.35

SCREW SPIKES

Cleveland R2	12.85
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity,Mo. S5	8.775
Lebanon,Pa. B2	8.775
Minnequa,Colo. C10	8.775
Pittsburgh J5	8.775
Seattle B3	9.275
S.Chicago,Ill. R2	8.775
Struthers,O. Y1	8.775
Youngstown R2	8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.25c; 1 15/16 to 8 in., inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. F6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	0	+19.25	3	+15.25	5.5	+11.75	8	+10
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	8.5	+9	9	+8.5	10.5	+7.75	10.5	+7.75	1	+17.75	1	+17.75
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	Seamless Tube Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	19.75	24.50	....	....	33.00	....	....	....	45.00	41.50
202	21.00	27.25	33.00	....	35.75	37.25	39.25	41.25	45.25	45.25
301	20.50	25.25	33.75	....	34.00	38.25	40.50	42.50	47.25	43.75
302	22.00	28.00	34.00	....	36.75	38.75	40.75	43.00	47.50	47.50
302B	21.75	28.25	35.25	....	40.25	38.75	40.75	43.00	50.00	50.00
303	....	28.50	37.00	....	....	41.50	43.75	45.50	52.00	52.00
304	23.25	29.25	36.00	....	39.75	40.75	43.00	45.75	50.25	50.25
304L	....	....	43.00	....	46.75	48.25	50.25	53.25	57.75	57.75
305	24.75	32.50	37.75	....	43.00	40.75	43.00	46.25	53.50	53.50
308	26.75	34.00	42.50	....	45.50	48.25	50.50	55.00	57.50	57.50
309	34.75	44.00	51.50	....	58.50	57.50	60.50	64.25	73.50	73.50
310	42.50	53.75	69.00	....	75.50	77.50	81.50	83.25	87.00	87.00
314	....	....	....	....	....	77.50	....	83.25	....	....
316	35.25	44.50	56.25	....	63.50	63.50	66.75	70.25	74.75	74.75
316L	....	....	62.75	....	70.00	71.00	74.25	77.75	82.25	82.25
317	43.00	54.50	70.00	....	81.50	79.50	83.50	86.25	93.25	93.25
321	28.25	35.75	42.25	....	48.75	48.00	50.25	54.50	60.00	60.00
18-8CbTa	32.75	42.00	56.25	....	58.25	56.25	59.00	63.75	73.00	73.00
403	....	....	30.75	....	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	....	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	....	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	....	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	....	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	....	32.00	33.50	35.25	49.75	49.75
431	....	27.25	35.50	....	....	39.75	41.75	43.50	53.00	53.00
446	....	....	37.75	....	56.75	42.50	44.75	46.00	67.25	80.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishon & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates 5%	Plates Carbon Base 10%	Plates Carbon Base 15%	Plates Carbon Base 20%	Sheets Carbon Base 20%
Stainless					
302	....	....	....	....	33.25
304	....	34.50	....	41.50	35.25
304-L	....	37.20	....	44.65	....
316	....	38.70	....	46.65	52.25
316-L	....	45.70	....	54.35	....
316-CB	....	45.90	....	54.75	....
321	....	36.35	....	43.40	42.00
347	....	39.50	....	48.45	51.00
405	....	29.20	....	37.05	....
410	....	28.70	....	36.55	....
430	....	28.70	....	36.55	....
Inconel	45.70	54.80	63.85	73.00	....
Nickel	37.95	46.25	54.60	62.95	....
Nickel, Low Carbon	38.25	46.90	55.60	64.40	....
Monel	40.30	49.10	57.95	66.80	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.60	41.40

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22 Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.7575
18	4	2	....	....	1.845
18	4	1	....	....	1.689
9	3.5	....	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross tons, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Alabama City, Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward, Ala. W15	58.50	59.00‡	63.00	....
Cincinnati, deld	....	66.79	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda, N.Y. W12	62.50	63.00	63.50	64.00
N. Tonawanda, N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester, N.Y., deld.	65.52	66.02	66.52	....
Syracuse, N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary, Ind. U5	62.50	....	63.00	....
S. Chicago, Ill. R2	62.50	....	63.00	....
S. Chicago, Ill. Y1	62.50	63.00	63.00	....
S. Chicago, Ill. U5	62.50	....	63.00	63.50
S. Chicago, Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.80	65.30	65.30	65.80
Muskegon, Mich., deld.	....	69.68	69.68	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Bethlehem, Pa. B2	64.50	65.00	65.50	66.00
New York, deld.	....	69.61	69.51	....
Newark, deld.	67.70	68.20	68.70	69.20
Birdsboro, Pa. B10	64.50	65.00	65.50	66.00
Chester, Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Steelton, Pa. B2	64.50	65.00	65.50	66.00
Swedeland, Pa. A3	64.50	65.00	65.50	66.00
Philadelphia, deld.	66.26	66.76	67.26	67.76
Troy, N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
Neville Island, Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.95
McKees Rocks, deld.	....	64.10	64.10	64.63
Lawrenceville, Homestead, Wilmerding, Monaca, deld.	....	64.76	64.76	65.29
Verona, Trafford deld.	64.79	65.32	65.32	65.85
Brackenridge, deld.	65.10	65.60	65.60	66.13
Bessemer, Pa. U5	62.50	....	63.00	63.50
Clairton Rankin & Duquesne, Pa. U5	62.50	....	....	....
Midland, Pa. C18	62.50	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard, O. Y1	....	....	63.00	....
Sharpsville, Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield O., deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie, Pa. I-3	62.50	63.00	63.00	63.50
Everett, Mass. E1	63.25	63.75	64.25	....
Fontana, Calif. K1	70.00	70.50	....	....
Geneva, Utah C11	62.50	63.00	....	....
Granite City, Ill. G4	64.40	64.90	65.40	....
Ironton, Utah C11	62.50	63.00	....	....
Lone Star, Texas L5	58.50*	59.00†	....	....
Minnequa, Colo. C10	64.50	65.00	65.50	....
Rockwood, Tenn. T3	....	59.00‡	63.00	....
Toledo, O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $56.50.
†Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; intermediate (Phos. 0.31-0.69%), $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson, O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

Niagara Falls, N.Y. P15	$92.50
Keokuk, Iowa, Open-hearth & Fdry, freight allowed K2	102.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	105.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles, Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood, Tenn. T3 (Phos. 0.035% max)	76.50
Steelton, Pa. B2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	74.05
Troy, N.Y. R2 (Phos. 0.035% max)	70.50
Cleveland, A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie, Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Neville Island, Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, Spokane, 10 cents; Atlanta, Houston, Seattle, no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.§	H.R. Alloy 4140††*		Carbon	Floor
Atlanta	8.07‖	9.27‖	9.83‖	....	8.16	8.30	...	10.14	....	8.44	8.40	10.22
Baltimore	7.79	8.99	9.12	....	8.27	8.34	8.37	9.09¹	15.69	8.57	8.12	9.56
Birmingham	7.68‖	8.88‖	8.85‖	....	7.78	7.91	8.44	10.04	....	8.08	8.01	10.04
Boston	8.70	9.73	11.02	....	8.79	8.88	9.43	10.71	14.46	8.90	8.98	10.39
Buffalo	7.75	8.90	10.72	....	8.00	8.00	8.70	8.70	14.30	8.25	8.25	9.80
Chattanooga	7.90‖	9.10‖	9.10‖	....	8.00	8.13	8.66	9.96	....	8.27	8.23	9.98
Chicago	7.70	8.90	9.70	....	7.78	7.91	8.44	8.35	13.95	8.08	8.01	9.28
Cincinnati	7.82	8.89	9.75	....	8.06	8.19	8.72	8.82	14.23	8.56	8.34	9.53
Cleveland	7.68	8.88	9.60	....	7.88	7.99	8.52	8.60	14.03	8.38	8.21	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.59	9.80	9.50	11.15
Detroit	7.91	9.13	10.02	....	8.10	8.18	8.71	8.68	14.19	8.55	8.33	9.49
Erie, Pa.	7.75	8.88	9.60¹⁰	....	7.90	8.00	8.65	8.70¹⁰	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.95	9.50	10.70	15.00	9.40	9.10	10.60
Jackson, Miss.	8.00‖	9.20‖	9.22‖	....	8.10	8.23	8.76	10.14	....	8.37	8.33	10.08
Los Angeles	8.90	10.65	11.65	....	9.10	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.82	9.02	9.82	....	7.90	8.03	8.56	8.57	14.07	8.24	8.13	9.38
Moline, Ill.	7.48	8.58	9.45	....	7.56	7.62	...	8.10	....	7.78	7.80	...
New York	8.35	9.53	10.23	57.73	8.81	8.83	9.38	10.61	14.37	8.74	8.78	10.06
Norfolk, Va.	7.85	...	...	....	8.30	8.35	...	10.80	....	8.60	8.10	9.60
Philadelphia	7.89	9.08	10.12	....	8.58	8.37	8.90	9.12	14.15	8.38	8.28	9.37
Pittsburgh	7.68	8.88	10.06	50.00	7.88	7.91	8.44	8.60	13.95	8.05	8.01	9.28
Portland, Oreg.	8.29	9.49	10.31	....	8.39	8.52	...	9.21	14.60	8.75	8.71	11.60
Richmond, Va.	8.05	...	10.09	....	8.45	8.70	9.20	10.00	....	8.80	8.35	9.70
St. Louis	8.02	9.21	10.03	....	8.11	8.25	8.78	8.93	14.28	8.48	8.34	9.59
St. Paul	7.83	8.78	9.80	....	7.91	7.97	...	8.70	....	8.13	8.15	9.42
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.35	11.20	11.55	....	9.50	9.30	9.85	13.15	15.55	9.15	9.05	11.25
Spokane, Wash.	9.35	11.35	11.55	....	9.50	9.30	9.85	13.15	16.30	9.15	9.05	11.25
Washington	8.37	10.57	...	....	9.06	8.92	...	9.67	....	9.15	8.70	10.14

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‖includes 35-cent bar quality extras; **¼-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; ¹—400 to 999 lb; ⁶—1000 to 1999 lb; ⁸—2000 to 3999 lb; ¹⁰—2000 lb and over.

J&L SHEET STEEL ON ANOTHER *Important* JOB

MOVABLE STEEL WALLS THAT ASSURE FLEXIBLE OFFICE LAYOUT

Crowded, inefficient general office areas

... are quickly transformed into

... efficient, private work units

Steel interior walls, easily installed and quickly rearranged, provide business management with an efficient means of allocating expensive floor area to keep pace with changing space requirements.

Because durability is one of the requirements for the basic material of these modern, attractive partitions, J&L high-quality sheet steel enjoys a growing acceptance among manufacturers of movable interior partitions.

J&L success in meeting their demands is the result of rigid quality control during production, coupled with a thorough understanding of product end use.

If you fabricate sheet steel, this formula for successful service can be applied to your requirements. Whatever your specifications for uniformity in workability, formability and drawing properties, you can depend on J&L sheet steel. It will help you get the best out of your production equipment and add to the value of your finished product.

Jones & Laughlin
STEEL CORPORATION · PITTSBURGH

Serving Steel Users Everywhere—
Linked by Water to the Middle West and South

J&L STEEL

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Grviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½-in. grains with fines: Chewelah, Wash., $43; Luning, Nev., $43; ⅝-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	25.00
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	33.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$32.50-33.00
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, contracts, nominally $1.35-1.40, per long ton unit, c.i.f. U.S. ports, duty for buyer's account; 46-47%, $1.10-1.15. Spot cargoes, 10 to 15% higher.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 3:1	$52.00-53.50
48% 2.8:1	nom. 49.00-50.00
48% no ratio	39.00-40.00

South African Transvaal

48% no ratio	$35.00-36.00
44% no ratio	25.00-26.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.35-3.80
60-65%	3.80-3.90

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f., Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b. Riverton, N.J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ¼ in. x 1.3 in.	24.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 85.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum frght, allowed	
Carlots	36.20
Ton lots	38.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	38.50-48.25†
Bronze, 5000-lb lots	59.50-63.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.00
Nickel-Silver, 5000-lb lots	58.00-61.00†
Phosphor-Copper, 5000-lb lots	65.00
Silicon	47.50
Solder	7.00*
Stainless Steel, 302	99.00
Stainless Steel, 316	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.75-33.00‡
Tungsten:	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over	4.50
Less than 1000 lb	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5¼	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.85
17	60	11.85
17	72	11.40
20	84	11.25
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.25-14.75
Connellsville, foundry	17.00-18.00

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N.J., ovens	28.50
Detroit, ovens	29.50
Pontiac, deld.	31.15
Saginaw, deld.	32.73
Erie, Pa., ovens	27.50
Everett, Mass., ovens New England, deld.	30.55*
Indianapolis, ovens	28.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearny, N.J., ovens	28.75
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	29.50
Painesville, O., ovens	29.50
Cleveland, deld.	31.55
Philadelphia, ovens	28.50
St. Louis, ovens	28.50
Neville Island (Pittsburgh), Pa., ovens	28.25
St. Paul, ovens	28.50
Chicago, deld.	31.82
Swedeland, Pa. ovens	28.50
Terre Haute, Ind., ovens	28.75

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb. landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.30	$7.30	$7.30	$7.70
Bar Size Angles	7.11	7.11	7.11	7.51
Structural Angles	7.50	7.50	7.50	7.90
I-Beams	7.75	7.75	7.75	8.15
Plates	9.35	9.35	9.35	9.75
Sheets, H.R.	8.75	8.75	8.75	9.15
Sheets, C.R. (drawing quality)	9.10	9.10	9.10	9.45
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	27.42	27.42	27.42	31.38
Barbed Wire (†)	6.61	6.61	6.61	6.96
Merchant Bars	7.30	7.30	7.30	7.70
Hot-Rolled Bands	7.50	7.50	7.50	7.90
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails	8.15	8.15	8.15	8.45

Oil Country Pipe: Mills withdrawn for remainder of the year.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton Pa. 21-23% Mn, $102; 19-21% Mn, 1-3% Si, $99.50; 16-19% Mn, $97.50

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) Base price per net ton $235, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C. 33.75c per lb of contained Mn, carload packed 35.05c, ton lots 36.55c, less ton 37.75c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 25.45c per lb of contained Mn, packed, carload 24.45c, ton lot 27.95c, less ton 28.25c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 96.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 32c; 2000 lb to min carload, 35c; 500 lb to 1999 lb, 37c; 50 lb cans, 37.5c. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.95c per lb of alloy. Packed, c.l. 14.15c, ton 14.60c, less ton 15.6c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract ton lot 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 20.55c, per lb of alloy, ton lot 22.10c; less ton lot 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ¼" thick) $1.29 per lb, ton lots $1.31; less ton lots $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max., C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 85c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed, 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si. Packed, c.l. 16c, ton lot 17.45c, less ton 19.1. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk 15.25c per pound contained silicon. Packed, c.l. 17.25c, ton lot, 19.95c; less ton, 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (Mn 98% Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Boralsil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to cl $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.5c per lb, f.o.b. Suspenston Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%; Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3½ lb each and containing 2 lb of Cr). Contract carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13.9c per lb of briquet, c.l. packed, pallets 14.1c bags 15.1c; 3000 lb to c.l., pallets 15.3c; 2000 lb to c.l. bags, 16.3c, less ton 17.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 14.4c per lb of briquet, c.l. packed, pallets, 14.6c; bags 15.6c, 3000 lb to c.l., pallets, 15.8c; 2000 lb to c.l., bags 16.8c; less ton 17.7c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.55c per lb of briquet, packed, pallets, 7.75c; bags 8.75c; 3000 lb to c.l., pallets 9.35c; 2000 lb to c.l. bags 10.35c; less ton 11.25c. Delivered. Spot, add 0.25c. (Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.7c. Packed, pallets 7.9c; bags 8.9c; 3000 lb to c.l. pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $4.95 per lb of contained Cb plus Ta, delivered; less ton lots $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½-in. x 12 M, 19c per lb of alloy, ton lots 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lots 20.15c; less ton lots 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lots 19.55c; less ton lots 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Elgio, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

(Concluded from page 126)

bridges, estimated 325 tons of reinforcing bars.

380 tons, 64 hatch covers, delivery classification yard, Messena, N. Y., Barnhart Island power plant, St. Lawrence seaway project; bids Nov. 15, New York State Power Authority, New York.

300 tons plus, also 125 tons of reinforcing, two Montana state bridges, Park and Fergus counties; bids to Helena, Mont., Oct. 25.

250 tons, junior and senior high schools, Perkasie, Pa.; pending.

221 tons, Washington state plate girder bridge undercrossing, Pierce county; Paul Jarvis Inc., Seattle, general award at $211,861.

200 tons, high school, Enola, Pa.; pending.

200 tons, repairs, Easton-Phillipsburg bridge, Delaware River Joint Toll Bridge Commission; Bethlehem Steel Co., Bethlehem, Pa., is low bidder.

195 tons, two state bridges, Mid-Cape highway, Orleans-Brewster, Mass.

190 tons, three rolled beam bridges and repairs, Bristol, Conn.; also 105 tons, reinforcing bars.

180 tons, West Penn High School, Schuylkill county, Pennsylvania; bids asked.

145 tons, state highway bridge, Piscataquis river, Abbot, Me.

130 tons, also 80 tons of reinforcing and 2000-bbl storage tankage, pump stations, bridge, etc.; bids to Bureau of Reclamation, Bridgeport, Wash., Nov. 15.

105 tons, state bridge work, Wyoming county, Pennsylvania; bids Oct. 26.

REINFORCING BARS . . .

REINFORCING BARS PLACED

300 tons, 5-story class room, Seattle University, to Northwest Steel Rolling Mills Inc., Seattle; Cawdrey & Vemo, Seattle, general contractor, low at $719,510.

180 tons, incinerator, Bridgeport, Conn., to Fireproof Products Corp., New York; Harry Maring Jr. Inc., Bridgeport, general contractor; Port Chester Iron Works awarded 60 tons of structural steel.

160 tons, two bridges, Noxon dam railroad relocation, for Washington Water Power Co., Spokane, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; Henry Hagman, Spokane, general contractor at $375,000.

REINFORCING BARS PENDING

600 tons, second unit Ft. Peck dam, Montana; Fegles Construction Co. Inc., Minneapolis, low at $2,336,000 to U. S. Engineer.

575 tons, two approaches to Washington state Maple street toll bridge, Spokane, Wash.; bids to Olympia, Wash., Oct. 30.

200 tons, Washington state highway projects, Klickitat, Thurston and Spokane counties; bids to Olympia, Wash., Oct. 30.

125 tons, plus miscellaneous, pump plant and laterals; bids to Bureau of Reclamation, Ephrata, Wash., Nov. 15.

PLATES . . .

PLATES PENDING

2500 tons, five tanks, Esso Standard Oil Co., Bayonne, N. J.; pending.

200 tons, water storage tank, Snohomish county PUD, Everett, Wash.; Chicago Bridge & Iron Co., Seattle, is low.

Unstated, large water storage tank; bids to Portland, Oreg., Oct. 24.

PIPE . . .

CAST IRON PIPE PLACED

300 tons, local improvements, Seattle, to U. S. Pipe & Foundry Co., Seattle.

200 tons, 12 in. to Pacific States Cast Iron Pipe Co., Seattle, for Auburn, Wash.

CAST IRON PIPE PENDING

200 tons, 4 to 12 in., Boeing Airplane expansion, Renton, Wash.; general bids in.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Norfolk & Western, thirty 1750-hp general purpose diesel-electric units, to the Electro-Motive Division, General Motors Corp., La Grange, Ill.

Duluth, Missabe & Iron Range, twenty 1750-hp diesel-electric road switchers, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Florida East Coast, ten 1750-hp general purpose diesel-electric units, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Central of Georgia, 250 seventy-ton covered hoppers, to Pullman-Standard Car Mfg. Co., Chicago.

Cambria & Indiana, 200 seventy-ton hoppers, to Bethlehem Steel Co., Bethlehem, Pa.

Northern Pacific, 100 covered hoppers, to ACF Industries Inc., New York.

Jersey Central, 50 seventy-ton covered hoppers, to ACF Industries Inc., New York.

Kansas Oklahoma & Gulf, five 70-ton insulated boxcars, to Pacific Car & Foundry Co., Renton, Wash.

Boston & Maine, 35 milk cars, to General American Transportation Corp., Chicago.

Delaware & Hudson, 25 baggage cars, to ACF Industries Inc., New York.

Northern Pacific, ten baggage cars, to Pullman-Standard Car Mfg. Co., Chicago.

Canadian National, one rail diesel car, to the Budd Co., Philadelphia.

RAILROAD CARS PENDING

Canadian National, 500 fifty-ton boxcars, 300 hoppers and 100 flatcars; bids asked.

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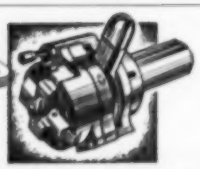

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Scrap Market Undertone Is Firm

Prices are off slightly at some points, but generally, they are holding in face of sluggish buying. High steel ingot rate is seen continuing

Scrap Prices, Page 140

Pittsburgh—There's a definite current of strength in the market, but a lack of major purchases has pushed No. 1 heavy melting down $1 to $56. Brokers are still filling old orders at $57, but most sales now are at the lower price. Cast iron grades are off. No. 1 cupola was down $3 in the past week, now averaging $52. Railroad scrap is strong, as is demand for stainless scrap.

Philadelphia—Scrap prices are steady. This is particularly true of the leading steel grades, with supply and demand in close balance.

In the cast grades, No. 1 cupola is off slightly to $53-$54, delivered. The undertone in heavy breakable cast and drop broken machinery is softer, but no change in prices is noted. Malleable continues nominally unchanged at $68, delivered.

New York — Continued high level steelmaking operations and well sustained export demand are imparting strength to the market here. Except for a slight reduction in machine shop turnings, now holding at $31-$32, brokers' buying prices are unchanged.

Cleveland — Scrap is marking time, pending resumption of active mill buying. Since the purchase ten days or so ago by a Valley mill, there has been practically no representative buying. Prices are holding at the level established on the last sale. No. 1 heavy melting is quoted at $61-$62 in Cleveland and $63-$64 in the Valley.

Cincinnati—Prices are firm, confirmed by a purchase last week by a local mill. Brokers say scrap is moving well, with steel mills operating at a high capacity level.

The only price change here concerns the $1 a ton increase on random rails to $68-$69. Rerolling mills are more active.

Buffalo—Prices are unchanged here, but dealers say the market undertone is a trifle weaker. New mill orders, expected soon, will clarify the situation.

Some market observers think the principal consumer will seek to buy tonnage for $1 to $2 below the current market. But dealers anticipate no sharp drop in prices, with quality scrap in strong demand and supplies limited.

Detroit—Prices are unchanged here. But with heavy auto production, supplies are becoming more ample. The feeling is that this may weaken the market.

Consumption is heavy, with the district steel mills pushing production at 101 per cent of capacity.

Chicago—Consumer buying remains light, and the bulk of activity centers in brokers completing old orders taken at higher prices than the current market. Their offering prices fail to impress dealers who are under no compulsion to sell. As they stand their ground, the market shows a certain stability. A possible exception is No. 2 dealer bundles which are reported

(*Please turn to page* 145)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Oct. 17	$56.67
Oct. 10	57.00
Sept. Avg.	59.08
Oct. 1955	45.17
Oct. 1951	43.60

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*55.00-56.00*
No. 2 heavy melting	49.00-50.00
No. 1 bundles	*55.00-56.00*
No. 2 bundles	46.00-47.00
No. 1 busheling	*55.00-56.00*
Machine shop turnings	38.00-39.00
Mixed borings, turnings	38.00-39.00
Short shovel turnings	42.00-43.00
Cast iron borings	42.00-43.00
Cut structurals, 3 ft lengths	*66.00-67.00*
Heavy turnings	*52.00-53.00*
Punchings & plate scrap	*66.00-67.00*
Electric furnace bundles	*66.00-67.00*

Cast Iron Grades

No. 1 cupola	*51.00-52.00*
Heavy breakable cast	49.00-50.00
Unstripped motor blocks	36.00-37.00
No. 1 machinery cast	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt	65.00-66.00
Rails, 2 ft and under	78.00-79.00
Rails, 18 in. and under	79.00-80.00
Rails, random lengths	75.00-76.00
Railroad specialties	72.00-73.00

Stainless Steel Scrap

18-8 bundles & solids	*450.00-475.00*
18-8 turnings	*250.00-265.00*
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	*61.00-62.00*
No. 2 heavy melting	44.00-45.00
No. 1 bundles	*61.00-62.00*
No. 2 bundles	40.00-41.00
No. 1 busheling	*61.00-62.00*
Machine shop turnings	32.50-33.50
Mixed borings, turnings	36.50-37.50
Short shovel turnings	36.50-37.50
Cast iron borings	36.50-37.50
Cut foundry steel	58.00-59.00
Low phos.	62.50-63.50
Cut structural plates 2 ft and under	*67.00-68.00*
Alloy free, short shovel turnings	43.00-44.00
Electric furnace bundles	*61.00-62.00*

Cast Iron Grades

No. 1 cupola	57.00-58.00
Charging box cast	50.00-51.00
Heavy breakable cast	48.00-49.00
Stove plate	54.00-55.00
Unstripped motor blocks	36.00-37.00
Brake shoes	44.00-45.00
Clean auto cast	56.00-57.00
Burnt cast	43.00-44.00
Drop broken machinery	59.00-60.00

Railroad Scrap

No. 1 R.R. heavy melt.	65.00-66.00
R.R. malleable	70.00-71.00
Rails, 2 ft and under	53.00-54.00
Rails, 18 in. and under	54.00-55.00
Rails, random lengths	80.00-81.00
Cast steel	69.00-70.00
Railroad specialties	74.00-75.00
Uncut tires	73.00-74.00
Angles, splice bars	75.00-76.00
Rails, rerolling	82.00-83.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	380.00-390.00
18-8 turnings	250.00-260.00
430 clips, bundles, solids	100.00-110.00
430 turnings	50.00-60.00

YOUNGSTOWN

No. 1 heavy melting	*63.00-64.00*
No. 2 heavy melting	47.00-48.00
No. 1 bundles	*63.00-64.00*
No. 2 bundles	43.00-44.00
No. 1 busheling	*63.00-64.00*
Machine shop turnings	34.00-35.00
Short shovel turnings	38.00-39.00
Cast iron borings	38.00-39.00
Low phos.	65.00-66.00
Electric furnace bundles	*63.00-64.00*

Railroad Scrap

No. 1 R.R. heavy melt.	66.00-67.00

CHICAGO

No. 1 heavy melting	56.00-60.00
No. 2 heavy melting	46.00-47.00
No. 1 factory bundles	*62.00-64.00*
No. 1 dealer bundles	56.00-57.00
No. 2 bundles	*41.00-42.00*
No. 1 busheling	56.00-60.00
Machine shop turnings	*35.00-36.00*
Mixed borings, turnings	37.00-38.00
Short shovel turnings	37.00-38.00
Cast iron borings	37.00-38.00
Cut structurals, 3 ft	*65.00-66.00*
Punchings & plate scrap	*66.00-67.00*

Cast Iron Grades

No. 1 cupola	50.00-51.00
Stove plate	46.00-47.00
Unstripped motor blocks	39.00-40.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt	62.00-63.00
R.R. malleable	70.00-71.00
Rails, 2 ft and under	81.00-82.00
Rails, 18 in. and under	82.00-83.00
Angles, splice bars	73.00-74.00
Rails, rerolling	*84.00-85.00*

Stainless Steel Scrap

18-8 bundles & solids	*505.00-515.00*
18-8 turnings	*355.00-375.00*
410 bundles & solids	*105.00-110.00*
410 turnings	*60.00-65.00*

DETROIT

Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	55.00
No. 2 heavy melting	41.00
No. 1 bundles	56.00
No. 2 bundles	37.00
No. 1 busheling	55.00
Machine shop turnings	30.00
Mixed borings, turnings	33.00
Short shovel turnings	34.00
Punchings & plate scrap	60.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	41.00
Stove plate	42.00
Heavy breakable	41.00
Unstripped motor blocks	32.00
Clean auto cast	53.00
Malleable	52.00

BIRMINGHAM

No. 1 R.R. heavy melt.	56.00-57.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	42.00-43.00
No. 2 bundles	34.00-35.00
No. 1 busheling	42.00-43.00
Cast iron borings	25.00-26.00
Short shovel turnings	35.00-36.00
Machine shop turnings	33.00-34.00
Bar crops and plate	59.00-60.00
Structural & plate, 2 ft	57.00-58.00
Electric furnace bundles	53.00-54.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	53.00-54.00
Stove plate	51.00-52.00
Unstripped motor blocks	45.00-46.00
Charging box cast	40.00-41.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	56.00-57.00
Rails, 18-in. and under	74.00-75.00
Rails, rerolling	77.00-78.00
Rails, random lengths	69.00-70.00
Angles, splice bars	70.00-71.00

PHILADELPHIA

No. 1 heavy melting	56.00-57.00
No. 2 heavy melting	48.00
No. 1 bundles	56.00-57.00
No. 2 bundles	45.00-47.00
No. 1 busheling	56.00-57.00
Electric furnace bundles	60.00
Mixed borings, turnings	41.00
Machine shop turnings	40.00
Short shovel turnings	44.00-45.00
Heavy turnings	52.00
Structurals & plates	61.00-62.00
Couplers, springs, wheels	68.00-70.00
Rail crops, 2 ft & under	76.00-77.00

Cast Iron Grades

No. 1 cupola	*53.00-54.00*
Malleable	68.00†
Heavy breakable cast	56.00-57.00
Drop broken machinery	58.00-59.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	52.00-53.00
No. 2 heavy melting	42.00-43.00
No. 1 bundles	52.00-53.00
No. 2 bundles	40.00-41.00
Machine shop turnings	*31.00-32.00*
Mixed borings, turnings	31.00-32.00
Short shovel turnings	37.00-38.00
Low phos. (structural & plate)	54.00-55.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	36.00-37.00
Heavy breakable	48.00-48.50

Stainless Steel

18-8 sheets, clips, solids	350.00-360.00
18-8 borings, turnings	200.00-210.00
430 sheets, clips, solids	115.00-120.00
410 sheets, clips, solids	105.00-110.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	48.00-49.00
No. 2 Heavy melting	37.00-37.50
No. 1 bundles	48.00-49.00
No. 2 bundles	35.00-35.50
No. 1 busheling	48.00-49.00
Machine shop turnings	29.00-30.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	32.00-33.00
No. 1 cast	44.50-45.50
Mixed cupola cast	40.00-41.00
No. 1 machinery cast	45.50-46.00

BUFFALO

No. 1 heavy melting	57.00-58.00
No. 2 heavy melting	45.00-46.00
No. 1 bundles	57.00-58.00
No. 2 bundles	42.00-43.00
No. 1 busheling	57.00-58.00
Mixed borings, turnings	34.00-35.00
Machine shop turnings	31.00-32.00
Short shovel turnings	35.00-36.00
Cast iron borings	34.00-35.00
Low phos.	60.00-61.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	49.00-50.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	71.00-72.00
Rails, 3 ft and under	77.00-78.00
Railroad specialties	68.00-69.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	56.00-57.00
No. 2 heavy melting	45.00-46.00
No. 1 bundles	56.00-57.00
No. 2 bundles	41.00-42.00
No. 1 busheling	56.00-57.00
Machine shop turnings	35.00-36.00
Mixed borings, turnings	37.00-38.00
Short shovel turnings	39.00-40.00
Cast iron borings	37.00-38.00
Low phos., 18 in.	62.00-63.00

Cast Iron Grades

No. 1 cupola	48.00-49.00
Heavy breakable cast	47.00-48.00
Charging box cast	48.00-49.00
Drop broken machinery	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt.	62.00-63.00
Rails, 18 in. and under	76.00-77.00
Rails, random lengths	*68.00-69.00*

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*51.50*
No. 2 heavy melting	45.00
No. 1 bundles	*51.50*
No. 2 bundles	41.00
No. 1 busheling	*51.50*
Machine shop turnings	32.00
Short shovel turnings	36.00

Cast Iron Grades

No. 1 cupola	50.00
Charging box cast	43.00
Heavy breakable cast	43.00
Unstripped motor blocks	43.00
Brake shoes	51.00
Clean auto cast	54.00
Stove plate	43.50

Railroad Scrap

No. 1 R.R. heavy melt.	*63.00*
Rails, 18 in. and under	*81.00*
Rails, rerolling	*88.00*
Rails, random lengths	*77.50*
Angles, splice bars	*61.00*

SEATTLE

No. 1 heavy melting	*53.00*
No. 2 heavy melting	*50.00*
No. 1 bundles	*50.00*
No. 2 bundles	*35.00*
Machine shop turnings	*28.00-30.00*
Mixed borings, turnings	*28.00-30.00*
Electric furnace No. 1	*60.00-65.00*

Cast Iron Grades

No. 1 cupola	*50.00-52.00*
Heavy breakable cast	*48.00-50.00*
No. 1 wheels	37.00
Unstripped motor blocks	*48.00-50.00*
Stove plate (f.o.b. plant)	*40.00-42.00*

LOS ANGELES

No. 1 heavy melting	50.00
No. 2 heavy melting	47.00
No. 1 bundles	48.00
No. 2 bundles	40.00
Machine shop turnings	29.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	46.00

SAN FRANCISCO

No. 1 Heavy melting	55.00
No. 2 heavy melting	52.00
No. 1 bundles	53.00
No. 2 bundles	43.00
Machine shop turnings	35.00
Mixed borings, turnings	35.00
Cast iron borings	35.00
Heavy turnings	35.00
Short shovel turnings	38.00
Cut structurals	62.00

Cast Iron Grades

No. 1 cupola	60.00
Charging box cast	45.00-47.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	60.00
No. 1 wheels	48.00
Drop broken machinery	60.00

HAMILTON, ONT.

No. 1 heavy melting	52.00
No. 2 heavy melting	47.00
No. 1 bundles	52.00
No. 2 bundles	42.50
Mixed steel scrap	46.00
Busheling, new factory: Prepared	50.00
Unprepared	46.00
Short steel turnings	34.00

Cast Iron Grades

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.

NICE IS THE WORD FOR BEARINGS

The NICE line of ball bearings includes over 750 sizes and types of standard bearings and more than 2500 "specials". If a new "special" is the answer to the problem, NICE engineers can design a bearing that will be exactly right for the particular application.

Write for Cat. No. 150

NICE

NICE BALL BEARING CO.

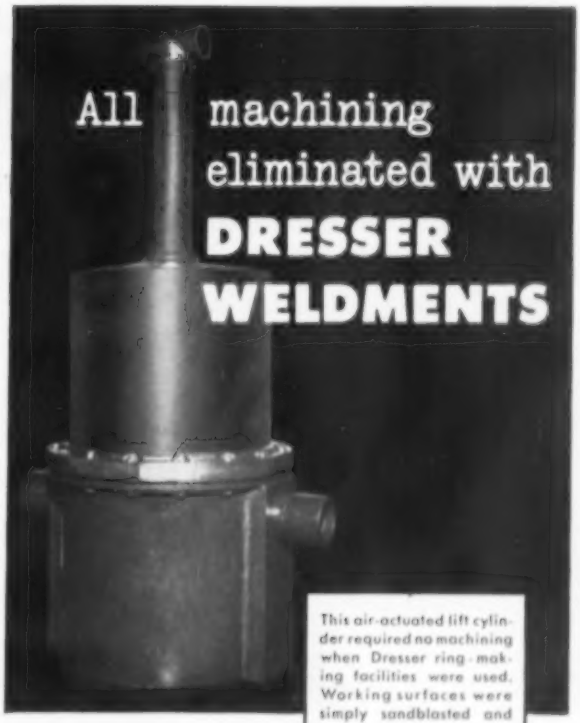
NICETOWN • PHILADELPHIA • PENNSYLVANIA

If METALWORKING PLANTS ARE YOUR PROSPECTS . . .

✔ ✔ ✔

STEEL can put you in touch with the important ones, those that do more than 92% of the industry's business. Tell the buyers and specifiers in these plants of the machines or materials you have for sale through an "Equipment—Materials" advertisement. For rates write STEEL, Penton Building, Cleveland 13, Ohio.

All machining eliminated with DRESSER WELDMENTS



This air-actuated lift cylinder required no machining when Dresser ring-making facilities were used. Working surfaces were simply sandblasted and burnished for smoothness.

Machining operations can be considerably reduced, sometimes eliminated, with Dresser Weldments. The first step is to think of your product's design in terms of rings—then consult with Dresser.

Instead of using heavy castings for circular parts, Dresser provides steel cylinders accurately sized and welded. Expensive man-hours for machining are reduced.

If you have a product using generally circular parts, call on Dresser know-how to save machining time, speed production, reduce scrap losses. Send for catalog number 56-S which tells how. No obligation.

Typical Dresser Weldments

- *Rings and Cylinders*—circular elements, may also be combined into composite weldment.
- *Hot-Formed Circular Parts* — extensive banks of presses and furnaces offer you economies in volume production.
- *Shafts or Circular Parts Welded from Dissimilar Metals* — available with a portion of the part resistant to heat, corrosion or abrasion—or provided with greater strength or hard surface in a localized section.

We'll gladly make recommendations at no cost to you. Just send sketch or print.

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DRESSER WELDMENTS

Dresser Manufacturing Division

119 FISHER AVENUE • BRADFORD, PA.

Detroit Puzzles Metals Men

Demand for nonferrous metals is lagging behind expanding supplies. One reason: Auto makers are holding back on orders. One result: Custom copper price drops to 37 cents

Nonferrous Metal Prices, Pages 144 & 145

A WAR of nerves (the automotive industry vs. producers of nonferrous metals) is being waged.

Auto makers, apparently waiting to test sales reaction to new models before letting orders for mill products, are not following their historical pattern of buying heavily for October and November delivery. The effects on some metals have been pronounced.

Copper—Copper prices skidded last week. After the Rhodesian Selection Trust Ltd. reduced its price from 37.50 to 35 cents a pound, U.S. custom smelters countered by dropping their price from 39 to 37 cents. The move unsettled the scrap market to such an extent that several major custom smelters withdrew from the market for a few days. Primary copper held at 40 cents a pound.

Copper, selling at about 54 cents a pound just a year ago, is in oversupply. The British Board of Trade is offering about 3000 tons a month for the next five to United Kingdom metal dealers and will dispose of 36,000 tons of stockpiled copper by the end of March, 1957. Rhodesian producers will be allowed to bid on 18,000 tons. Crux: The release of the surplus, combined with the hesitancy of the automotive industry to enter the market for brass mill products, has helped push the price down.

Outlook—Production of refined copper by the Free World should top 3 million tons in 1956. Increased production without increased demand could drop its price to a more normal level of about 35 cents a pound. Case in point: The London Metal Exchange bidding price was 35 cents a pound at the first call on Oct. 17.

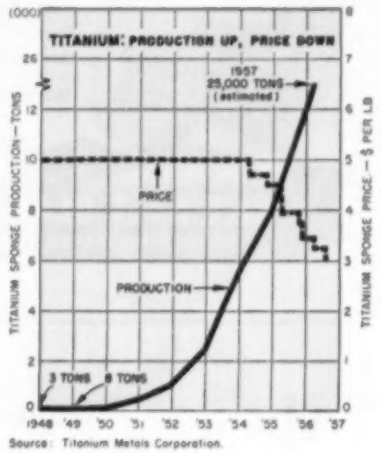
Zinc—Steel mill orders for zinc continue to hold at peak levels. Diecasters are ordering with increased interest. Zinc for the production of brass remains in the doldrums. The influx of orders from diecasters may indicate that Detroit will soon be in the market for other nonferrous metals.

Aluminum — Sales are on a plateau. With additional capacity coming in almost monthly, there will be an oversupply of the metal this year, but it should be pointed out that (at the request of the industry) there have been no stockpile calls for it this year. And the industry's advisory group to the government wants this policy to be continued during the first half of 1957. Explains one producer: "There are two factors which make us optimistic: 1. Expanding markets force us to carry a wider variety of products in inventory and in our pipelines, raising inventory requirements. 2. The extra aluminum available will allow us to develop new markets."

Orders from aluminum diecasters are still just a trickle, but indications are that a torrent of them is on the way. Motordom holds the key.

ODM Softening on Nickel?

The Defense department may be wrestling with the problem of how and when to stop or reduce nickel stockpile requirements. It is felt that the Office of Defense Mobilization may be ready to go along with a recommendation to reduce the government's take for stockpile needs. Point of interest: If such a thing comes about, the government might drop its equitable distribution program, allowing producers to set up their own standards without U.S. supervision. On the minus side so far as civilian users are concerned: The studies may be the result of mushrooming military requirements. This could mean that the total amount diverted from stockpile would find its way into the military machine.



Source: Titanium Metals Corporation

Lead Sales Hold Even

Ignoring the shakiness of other metals, lead continues to hold at high levels. Sales last week were not of the avalanche variety but solid enough to hold the market at its relatively high plateau. The price is firm at 16 cents a pound.

NONFERROUS PRICE RECORD

	Price Oct. 17	Last Change		Previous Price	Sept. Avg.	Aug. Avg.	Oct., 1955 Avg.
Copper	37.00-40.00	Oct.	15, 1956	39.00-40.00	39.500	39.750	44.594
Lead	15.80	Jan.	13, 1956	16.30	15.800	15.800	15.300
Zinc	13.50	Jan.	6, 1956	13.00	13.500	13.500	13.020
Tin	107.125	Oct.	16, 1956	107.00	103.745	99.043	96.236
Nickel	64.50	Nov.	24, 1954	60.00	64.500	64.500	64.500
Aluminum	27.10	Aug.	10, 1956	25.90	27.100	26.700	24.400
Magnesium	35.25	Aug.	13, 1956	33.75	35.250	34.894	32.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

BRIDGEPORT BRASS COMPANY

COPPER ALLOY BULLETIN

Bridgeport Brass Co.

Reporting new developments in copper-base alloys and metalworking methods.

These copper wall tiles made from Bridgeport copper are ideal where rich, warm decoration is desired. (Photo courtesy House of Time, Inc.)

Bridgeport Copper Gives Gleaming Beauty to Vikon Tile

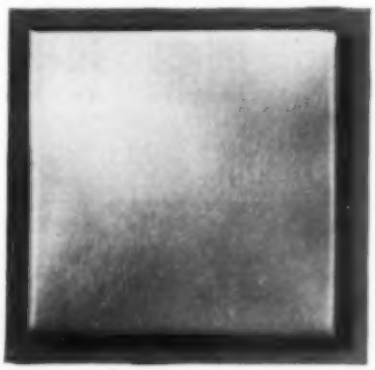
Vikon Tile Co., Washington, N. J., manufactures a complete line of metal and plastic tile. For their copper tile, widely used in kitchens and for decorative effects, it was important that the material chosen fit very exacting requirements—and Bridgeport Copper met those specifications.

The copper had to be easy to cold-work and have the right temper to give the desired rigidity after forming. It had to have a consistently unblemished surface to assure a uniform finish. Ease of lacquering was also important.

For these tiles, Bridgeport recommended and supplied Alloy #102, 28 gage (.0126 in. thick) roll copper.

The roll copper is first put through a passifator bath to retard tarnishing. After drying, the passifated copper is sent to presses for stamping. The stamped tiles then go to the spray department where they are coated front and back with a clear synthetic lacquer. This finish is baked on the surface, and serves as a further protection against tarnishing.

This is another successful example of a Bridgeport metal that is *matched to the job*. Vikon, like other manufacturers, has found Bridgeport a dependable source of quality material.



Finished tiles have a beautiful satin-like sheen. The burnished surface allows tiles to be alternately placed to obtain checkerboard patterns.

Railhead Bond Made From Bridgeport Phono-Electric Rod Gives Dependable Service

Hanlon & Wilson Co. of Wilkinsburg, Pa., manufactures their quality rail bond from Bridgeport Phono-Electric Cadmium Copper, Alloy #985.

For the terminals, Hanlon & Wilson needed a metal that had a coefficient of expansion approximating railroad steel . . . one that had excellent cold-flow properties as well as high conductivity. High strength and maximum resistance to corrosion were also desirable qualities.

Bridgeport Technical Service studied the requirements for the rail bond, then suggested Alloy #985, Phono-Electric Cadmium Copper rod, in $\frac{1}{2}$" diameter. Terminals were drilled through, pressed in three operations and rotary swaged to the cable. The cable strand is made from Alloy #985 wire.

Hanlon & Wilson Co. rail bonds are shown before plating (at left) and after plating (at right).

Both in manufacturing processes and in actual use, Bridgeport Alloy #985 proved to be entirely satisfactory. Why? Because the metal is *matched to the job it is expected to do*. This metallurgical service is available to you without obligation. Just phone or write your nearest Bridgeport Sales Office for expert advice . . . and for high-quality brass, copper and aluminum. (913)

Bridgeport Brass Co.

BRIDGEPORT BRASS COMPANY ♦ BRIDGEPORT, CONNECTICUT

Mills at Bridgeport, Conn., Indianapolis, Ind., and Adrian, Mich. Sales Offices in Principal Cities—Conveniently Located Warehouses

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 30-lb ingots.

Antimony: R.M.M brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 2.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 40.00 deld. Conn. valley; 40.00 deld. Midwest; custom smelters, 37.00 deld.; lake, 40.00 deld.; fire refined, 39.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $90-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 16.90, St. Louis. New York basis, add 0.20.

Lithium: 98 + %, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand castings), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $103-$108 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $115-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15 per lb.

Silver: Open market, 91.00 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 107.125; prompt, 106.875.

Titanium: Sponge, 99.3 + %, grade A-1 ductile (0.2% Fe max), $3.00; grade A-2 (0.5% Fe max), $2.70 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb, add 15.00; 99 + % hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 14.00; brass special, 14.25; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld. Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 26.25-29.25; No. 12 foundry alloy (No. 2 grade), 24.50-25.00; 5% silicon alloy, 0.60 Cu max, 26.50-27.50; 13 alloy, 0.60 Cu max, 26.50-27.50; 195 alloy, 27.00-27.75; 108 alloy, 25.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 24.75; grade 2, 24.00; grade 3, 23.25; grade 4, 22.75.

Brass Ingot: Red brass, No. 115, 36.50; tin bronze, No. 225, 47.50; No. 245, 41.50; high-leaded tin bronze, No. 305, 40.00; No. 1 yellow, No. 405, 28.75; manganese bronze, No. 421, 32.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy) Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 45.35¢; l.c.l., 45.98. Weatherproof, 30,000-lb lots, 43.78¢; l.c.l., 44.53. Magnet wire deld., 15,000 lb or more, 52.68¢; l.c.l., 53.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheet and strip, $12.10-$13.00; sheared mill plate, $10.50-$12.00; wire, $9.50-$11.50; forging billets, $7.25-$7.50; hot-rolled and forged bars, $7.55-$7.80.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	113	97	118
Strip, C.R.	111	99	128
Plate, H.R.	107	96	111
Rod, Shapes, H.R.	94	80	99
Seamless Tubes	144	129	190

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam.(in.)or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

ALUMINUM (continued)

Sheets and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.136	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	39.60-42.90
0.037-0.030	44.30-56.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-56.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam, 72-180 lengths.

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 45.10-63.20 in random lengths, 0.375-4 in. thick width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size(in.)		Nom. Pipe Size(in.)	
¼	$18.45	2	$ 87.90
1	29.00	4	187.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; 0.81 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0, 93.30. Tread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.30-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots) **Aluminum:** 1100 clippings, 16.00-16.50; old sheets, 12.50-13.00; borings and turnings, 7.00-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	61.63b	58.86c	....	61.82	36.000	36.000	35.250
Yellow Brass	52.10	42.65d	52.64	55.01	27.250	27.000	25.125
Low Brass, 80%	55.85	55.79	56.39	58.66	30.625	30.375	29.875
Red Brass, 85%	57.19	57.13	57.73	60.00	31.875	31.625	31.125
Com. Bronze, 90%	59.08	59.02	59.62	61.84	33.125	32.875	32.375
Manganese Bronze	49.46	53.84	63.80	....	25.250	25.000	24.500
Munts Bronze	53.84	49.65	....	....	25.625	25.375	24.875
Naval Brass	55.72	50.03	62.78	58.88	25.250	25.000	24.500
Silicon Bronze	65.22	64.41	65.26	67.26e	35.000	34.750	34.000
Nickel Silver, 10%	67.76	70.09g	70.09	....	32.750	32.500	16.375
Phos. Bronze, A, 5%	79.58	80.08	80.08	81.26	36.250	36.000	35.000

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

7.50; crankcases, 12.50-13.00; industrial castings, 12.50-13.00.

Copper and Brass: No. 1 heavy copper and wire, 28.00-28.50; No. 2 heavy copper and wire, 27.00-27.50; light copper, 24.00-24.50; No. 1 composition red brass, 23.50-24.50; No. 1 composition turnings, 22.50-23.50; yellow brass turnings, 14.00-14.50; new brass clippings, 22.50-23.00; light brass, 14.00-14.50; heavy yellow brass, 16.00-16.50; new brass rod ends, 21.00-21.50; auto radiators, unsweated, 18.00-18.50; cocks and faucets, 18.50-19.50; brass pipe, 20.50-21.00.

Lead: Heavy, 12.50-13.00; battery plates, 7.00-7.25; linotype and stereotype, 13.50-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.50-14.50.

Monel: Clippings, 80.00-90.00; old sheets, 70.00-80.00; turnings, 70.00-80.00; rods, 80.00-90.00.

Nickel: Sheets and clips, 130.00-195.00; rolled anodes, 130.00-195.00; turnings, 110.00-165.00; rod ends, 130.00-195.00.

Zinc: Old zinc, 4.50-5.50; new die-cast scrap, 4.00-4.50; old die-cast scrap, 2.50-3.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 19.00-19.50; 3003 clippings, 19.00-19.25; 6151 clippings, 19.00-19.25; 5052 clippings, 19.00; 2014 clippings, 18.00-19.00; 2017 clippings, 18.00-19.00; 2024 clippings, 18.00-19.00; mixed clippings, 18.00; old sheets, 16.00; old cast, 16.00-16.50; clean old cable (free of steel), 18.25-19.00; borings and turnings, 16.00-17.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 62.00; light scrap, 57.00; turnings and borings, 42.00.

Copper and Brass: No. 1 heavy copper and wire, 31.25; No. 2 heavy copper and wire, 29.75; light copper, 28.50; refinery brass (60% copper) per dry copper content, 27.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 29.75-31.25; No. 2 heavy copper and wire, 29.25-29.75; light copper, 27.00-27.50; No. 1 composition borings, 27.50-27.75; No. 1 composition solids, 28.00-28.25; heavy yellow brass solids, 20.50; yellow brass turnings, 18.50; radiators, 22.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 58.29; oval, 57.54, 5000-10,000 lb; electrodeposited, 50.28; 2000-5000 lb lots; cast, 52.54, 5000-10,000 lb quantities.
Nickel: Depolarized, less than 100 lb, $1.015; 10-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 125.50; 200-499 lb, 124.00; 500-999 lb, 123.50; 1000 lb or more, 123.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.
Chromic Acid: Less than 10,000 lb, 30.25, over 10,000 lb, 29.50.

Copper Cyanide: 100-1000 lb, 80.50.
Copper Sulphate: 500-1900 lb, 21.15; 2000 lb and over, 18.65.

Nickel Chloride: 10 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. Prices eastern delivery.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. Prices eastern delivery.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.50; 20,000 lb and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 74.80; 100-600 lb, 66.10; 700-1900 lb, 63.60; 2000-9900 lb, 61.90; 10,000 lb or more, 60.70.

Stannous Chloride (anhydrous): Less than 25 lb, 172.60; 25 lb, 137.60; 100 lb, 122.60; 400 lb, 120.20; 5200-19,600 lb, 108.00; 20,000 lb or more, 95.80.

Stannous Sulphate: Less than 50 lb, 135.10; 50 lb, 105.10; 100-1900 lb, 103.10; 2000 lb or more, 101.10.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(*Continued from page 139*)

to have found takers from brokers' offers of $3 to $4 below last acquisitions.

St. Louis—Scrap prices are off in several grades. Supplies are adequate. Railroad material prices are down 50 cents to $3 a ton, reflecting improved supply conditions.

Birmingham—Buying has slowed down here, but prices are unchanged. Foundries that were quantity buyers a week or so ago are mostly out of the market. Cast iron buyers, apparently with stockpiles built up, are ordering only for replacement.

Exports are slower, and prices are off about $3 a ton under those recently quoted. Exporters are not thought likely to do much new buying until next month.

Los Angeles—Dealers report the market is firm, with prices steadier than they have been in three months. Shortages of No. 1 cupola cast and certain grades of steelmaking scrap continue.

San Francisco — Record high prices for steel scrap here have attracted increased offerings, but the heavier tonnage is readily absorbed with mill and export demands running strong.

Seattle—Weakness in the eastern scrap markets is not being duplicated in the Pacific coast area. Local prices are up $2 to $5, with No. 1 and No. 2 heavy melting quoted at $53 and $50. They are the highest prices on record here.

The strength in the market is attributed largely to the strong export influence. Japan is buying

CLASSIFIED

Help Wanted

MACHINE SHOP FOREMAN
Well established producer and fabricater of welded steel tubing has opening for aggressive experienced Machine Shop Foreman. Duties include design and production of all tools, rolls, bending dies, and gauges, and special equipment. Good salary and benefits. Write Box 475, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

METALLURGIST—DEGREE AND EXTENSIVE technical, administrative, and executive experience with ferrous and nonferrous casting, sheet metal fabrication, welding and heat-treating. Excellent writer and speaker with international reputation. Reply Box 479, STEEL, Penton Bldg., Cleveland 13, Ohio.

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KAISER ENGINEERS

will bring you to mild, smog-free San Francisco Bay Area

Do you and your family want to enjoy sunshine, mild climate, indoor-outdoor living, and new schools? Beaches, mountains, and metropolitan recreation? Plus life insurance, free family health plan—retirement, moving allowance, etc.?

This can be yours if you have an M.E. degree, 10 years of steel mill development experience including plant layout, construction design, and are interested in planning the future of the West's largest steel mill.

Investigate. Write today in strict confidence, stating salary required.

KAISER ENGINEERS
DEPT R1 1924 BROADWAY,
OAKLAND 12, CALIFORNIA
DIVISION OF HENRY J. KAISER CO.

COMMISSION REPRESENTATIVES WANTED
WELL RATED NATIONALLY KNOWN MANUFACTURER OF ROLL FORMED SECTIONS, MOULDING, BUTT AND LOCKSEAM TUBING, ANGLES, CHANNELS ETC., IS EXPANDING AND DESIRES ADDITIONAL REPRESENTATION. TERRITORIES OPEN INCLUDE BIRMINGHAM, CHICAGO, MILWAUKEE, BOSTON, HOUSTON, NEW ORLEANS, LOS ANGELES AND ROCK ISLAND AREAS. IF YOU ARE A SUCCESSFUL, ESTABLISHED ORGANIZATION CALLING ON USERS OF STEEL AND NON-FERROUS METALS AND DESIRE AN ADDITIONAL LINE, WRITE US, GIVING FULL INFORMATION.
ROLL FORMED PRODUCTS COMPANY
P.O. BOX 418
YOUNGSTOWN, OHIO

CHIEF METALLURGIST
Fully qualified in Blast Furnace and Open Hearth operation plus flat rolled hot and cold strip steel—good growth possibilities and fully integrated steel plant. Salary open.
Reply Box 478, STEEL
Penton Bldg. Cleveland 13, Ohio

FROM STOCK
IMMEDIATE SHIPMENT
STRUCTURAL WIDE FLANGE BEAMS ASTM-A-7
400 TONS 10" x 5¾" x 21# x 40'
200 TONS 12" x 6½" x 27# x 40'
PRICE: **$12.60** per cwt., net
All Extras Included
FOR QUICK ACTION
WRITE OR WIRE
Box 476, STEEL
Penton Bldg. Cleveland 13, Ohio

WANT TO BUY SMALL TOOL AND DIE SHOP EQUIPMENT TO PUT IN PLANT OF GOING CONCERN. ALSO WOULD WANT EXPERIENCED MAN TO OPERATE.
REPLY BOX 470, STEEL
PENTON BLDG. CLEVELAND 13, OHIO

in large volume.

Domestic turnover also continues active. Pacific Coast melters are fully engaged and are buying in proportion.

Semifinished Steel . . .

Semifinished Prices, Page 139

Sharon Steel Corp. will complete a major portion of its expansion program this fall.

The company will have over 2 million tons of ingot capacity when the program is finished. More than $20 million will be spent.

The project includes a $14-million blooming mill, enlargement of open-hearth facilities and the installation of an electric furnace shop at the Roemer Works in Farrell, Pa.

Pig Iron . . .

Pig Iron Prices, Page 134

Consumption of pig iron by foundries is picking up slowly, particularly in automotive shops. Most consumers are operating five days a week, close to 100 per cent of normal. They are receiving a steady flow of new business.

Foundries generally are carrying moderate stocks, averaging between 30 and 60 days. There are scattered exceptions. In the Chicago district, many foundries have not reduced their inventories from the high levels built up before the steel strike. Low activity in the farm implement industry is holding several foundries in check.

No pressure on supply is developing. In the East, supply is described as adequate, although Alan Wood Steel Co., Swedeland, Pa., is beginning to withdraw from the merchant trade. It will suspend operations at its smaller furnace around the first of the year for enlargement and general rehabilitation. This work may require several months. Other producers are in position to fill the gap at least for the time being.

Mills in the Buffalo district are using a high percentage of their iron output in their own open-hearth melts. There appears to be sufficient merchant iron available to meet all demands.

Iron Ore . . .

Iron Ore Prices, Page 136

Shipments of iron ore down the Great Lakes in the week ended Oct. 15 totaled 2,949,775 gross tons, reports the Lake Superior Iron Ore Association. This compares with 2,794,730 tons in the preceding week, and 2,910,090 tons in the like week a year ago.

The cumulative total to Oct. 15 was 60,444,551 gross tons. This is 12,984,518 tons under the 73,429,069 tons moved during the same period last year.

Two million tons of iron ore pellets per year will be purchased by Pickands Mather & Co., Cleveland, from Canadian Javelin Ltd., Montreal, Canada. Delivery agreements run from 1959 through 1964. Pickands Mather has leased the Labrador site of the ore on behalf of itself and Steel Co. of Canada Ltd. Located 200 miles north of Seven Islands, the property covers a part of the Wabush lake area Javelin has leased from Newfoundland. It is said that 200 million tons of concentrates may be eventually obtained from open pit mining operations at the site.

Rails, Cars . . .

Track Material Prices, Page 132

Freight car business is somewhat more active than it was. One feature of the market is a stronger demand for covered hopper cars.

Electro-Motive Division, General Motors Corp., La Grange, Ill., has advanced its diesel locomotive prices by 4.5 to 5 per cent, effective on shipments after Dec. 1.

Deliveries of new freight cars dropped to 3444 in September, compared with 5364 in August, and 3118 in September, 1955, reports the American Railway Car Institute and the Association of American Railroads. Orders for new cars increased slightly to 3949 in the month, against 2575 in August and 3228 in September last year.

New orders were up by 1374 cars, compared with those of the preceding month; and deliveries were down 1920 units, compared with the August total, but the backlog of cars on order and undelivered totaled 122,421 on Oct. 1, down 449 from the 122,870 units on Sept. 1. A year ago the backlog was only 52,913.

YARD and FACTORY
TRAILERS

Fifth wheel steer. Pneumatic tires. Steel deck. Oak end and side racks.

CUSTOM-BUILT and quality-built for long-time, low-cost service. Flat steel wheels, solid rubber or pneumatic tires. Fifth-wheel or four-wheel knuckle steer. Steel or wood deck, or special superstructure. Any desired capacity.

Telephone or write to:

OUR 42ND YEAR

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EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

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UPSON-WALTON
DROP-FORGED
STEEL

GOLD CLIPS

for wire rope

NEW U-W
GOLD CLIP

ENGINEERED FOR SAFETY

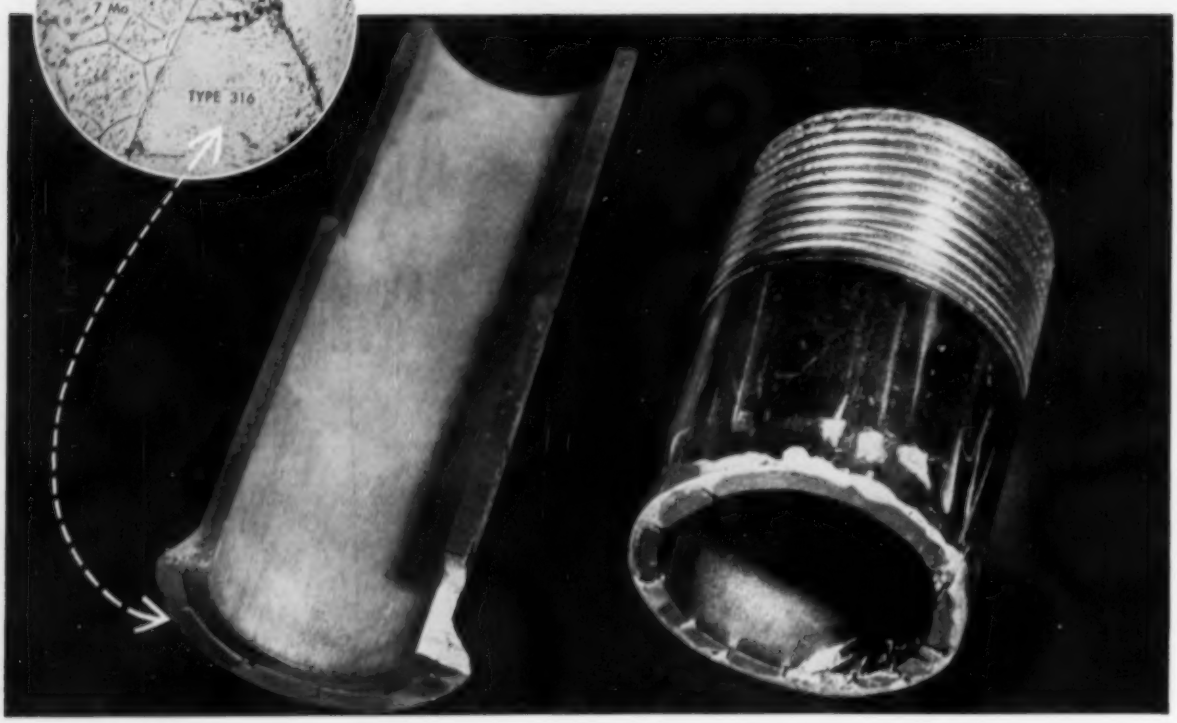
● The new *Gold Clip* is your quick identification of top quality, gold-chromate coated after galvanizing for extra protection. All *Gold Clips* are drop-forged from high grade forging steel . . . designed for the toughest heavy duty service.

Specify *Gold Clip* . . . available from stock in ¼" through 1¼" sizes, conveniently packaged in standard quantities. See your distributor for quick and efficient service. Write for literature on wire rope fittings.

THE UPSON-WALTON CO.
12500 ELMWOOD AVENUE • CLEVELAND 11, OHIO
NEW YORK • CHICAGO • PITTSBURGH
MANUFACTURERS OF
WIRE ROPE, TACKLE BLOCKS,
CRANE HOOK BLOCKS, ROPE FITTINGS
ESTABLISHED 1871

For cost-saving control of...

STRESS CORROSION CRACKING



Carpenter 7Mo Stainless Tubing & Pipe

Take a closer look at the above section of Carpenter 7Mo Stainless Pipe welded to a Type 316 fitting. See how stress corrosion cracking has ruined the fitting, just as it has destroyed the piece of stainless pipe at right.

Note how the cracks in the fitting stop abruptly when they reach the 7Mo pipe. And this pipe has already outlasted three such fittings. The photomicrograph shows the unmistakable proof.

If you have conditions where chlorides, caustic or sulphite solutions are present, Carpenter 7Mo's excellent resistance to general corrosion, pitting and stress corrosion cracking may prove to be a real cost-saver. Let's discuss your particular application now.

The Carpenter Steel Company
Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Write for this Carpenter 7Mo Technical Bulletin.

Carpenter

Stainless Tubing & Pipe

New Ideas IN EQUIPMENT FOR CONTINUOUS COATING LINES

● New ideas recently developed by Aetna-Standard make Continuous Coating Lines more efficient. One idea focuses on a new approach for **Loop Cars.** The use of Loop Cars eliminates deep loop pit excavation and keeps strip in full view for easier inspection.

New Aetna ideas contribute to an even better finished product. Space saving in the installation results in lower first cost. There is less equipment to buy and to install.

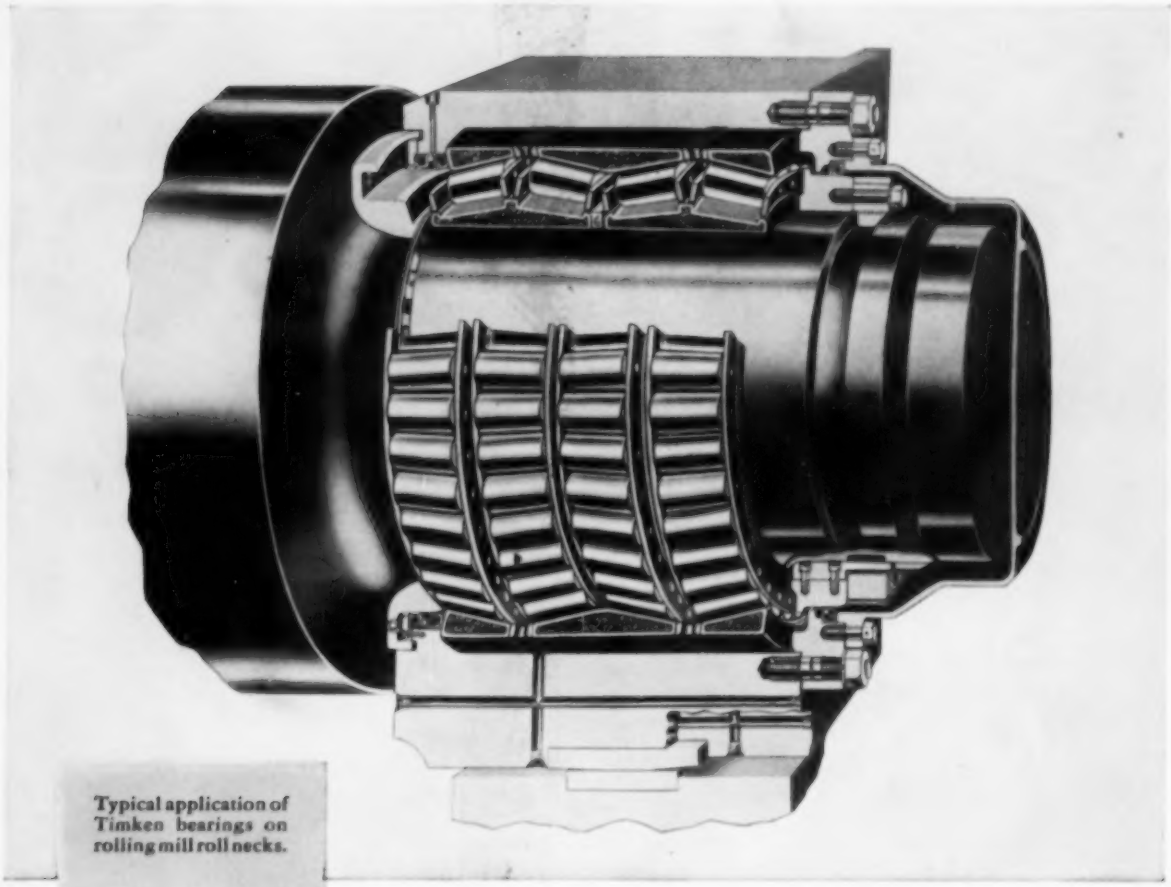
Aetna-Standard has installed more Continuous Galvanizing Lines than all other manufacturers combined.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

CONTINUOUS GALVANIZING LINES ● CONTINUOUS ELECTROLYTIC TINNING LINES ● SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT ● CONTINUOUS BUTT WELD PIPE MILLS ● SEAMLESS TUBE MILLS ● DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT ● ROLLS AND CASTINGS ● EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC



Typical application of Timken bearings on rolling mill roll necks.

Why 5 famous steel slab and blooming mills chose TIMKEN® bearings for the roll necks

TIMKEN® roll neck bearings are helping to cut costs in slab and blooming mills at Lone Star Steel, Steel Company of Wales, Newport Steel, Pittsburgh Steel, and another well known mill. These five rolling mill operators have found that the long life of Timken tapered roller bearings keeps bearing cost per ton of steel rolled to a minimum.

By holding rolls rigid, Timken bearings help insure "on-gauge" operation, cut scrap loss. By holding shafts and housings concentric, Timken bearings make closures more effective, cut lubricant leakage. Grease-lubricated Timken bearings need no tubes, pipes or reservoirs. Lubricating system maintenance is greatly reduced. And no extra thrust devices are needed —Timken bearings take radial *and* thrust loads.

Geometrically designed and precision-made to give true rolling motion, Timken bearings practically eliminate friction, make acceleration easier, conserve power. Higher rolling speeds are possible. Mills can be stopped and restarted with no loss of steel—Timken bearings permit starting under full load. And prolonged roll life is assured because Timken bearings provide maximum roll neck strength, less wear. The Timken Roller Bearing Company, Canton 6, Ohio. **CANADIAN PLANT:** St. Thomas, Ont. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN *TAPERED ROLLER BEARINGS ROLL THE LOAD*

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